Commodore® MAGAZINE

128 Mode & Gold Mine, see p. 59 & 62.

RUN

December 1989
An IDG Communications Publication

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THE COMMODORE 64/128 USER'S GUIDE

BEST GAMES OF 1989

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The Dramatic Search for PRODUCTIVITY SOFTWARE

PLUS!

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- C-64 High-Speed Loader
- GEOS and C-128 Season's Greetings

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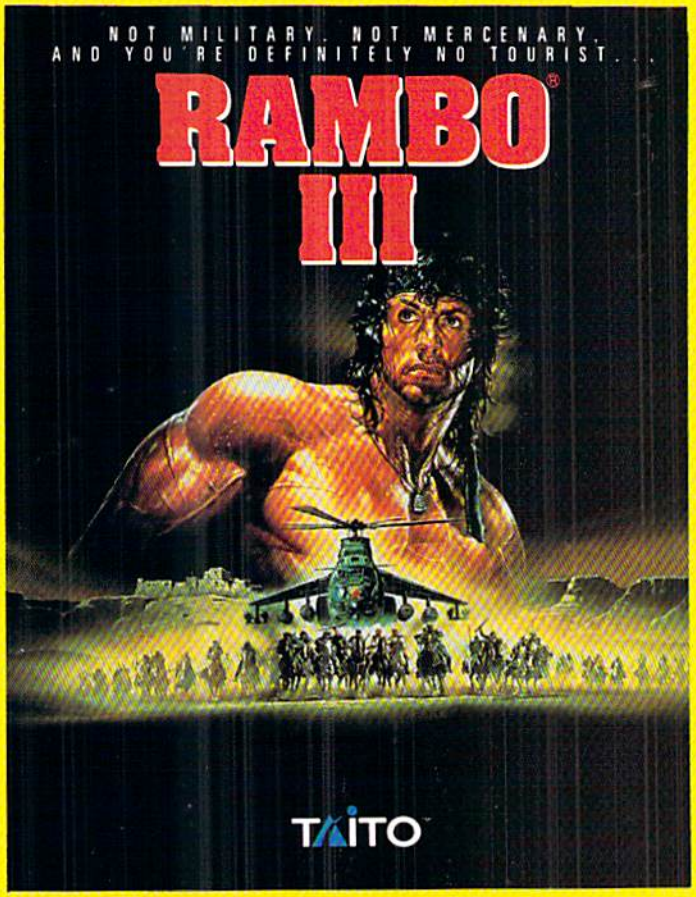
RAMBO® III



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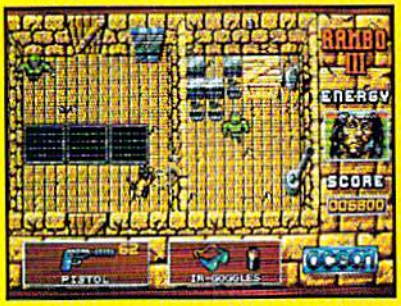
Amiga game screens.



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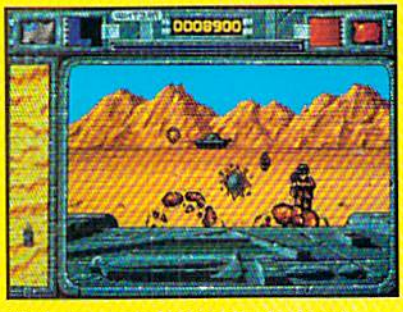

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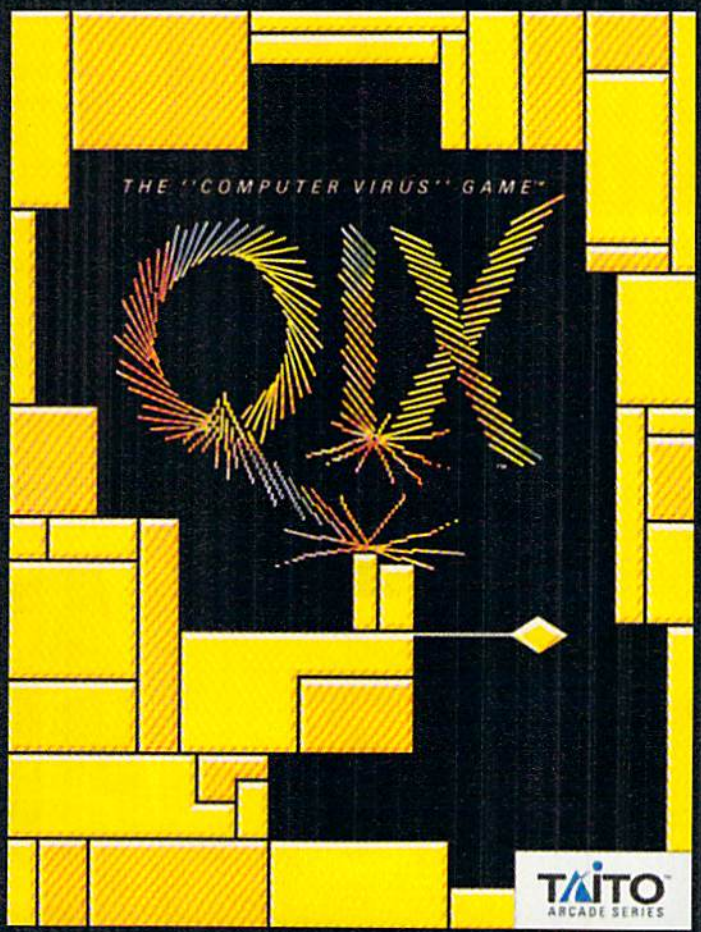

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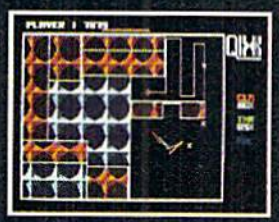
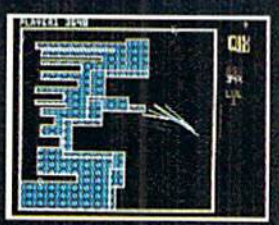
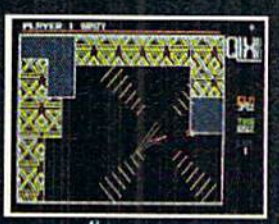


Actual Atari screen.



Actual C/64 screen.



Actual Amiga screen.

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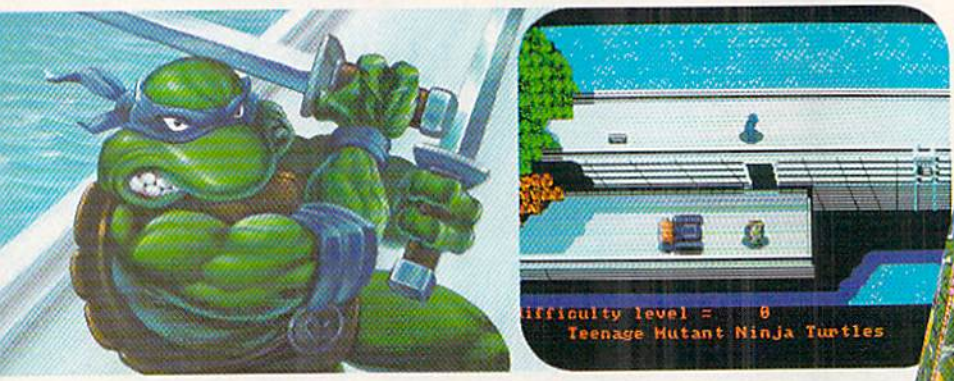

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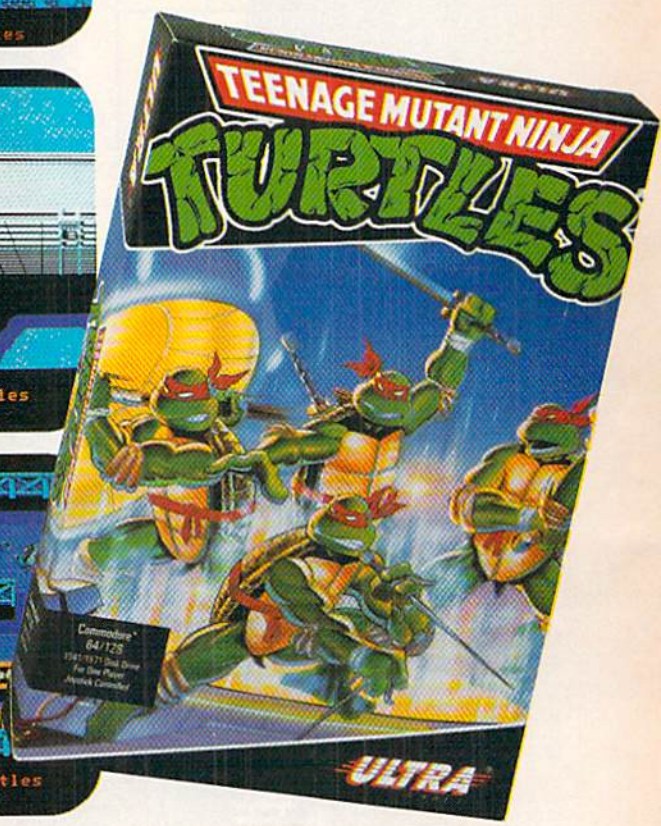

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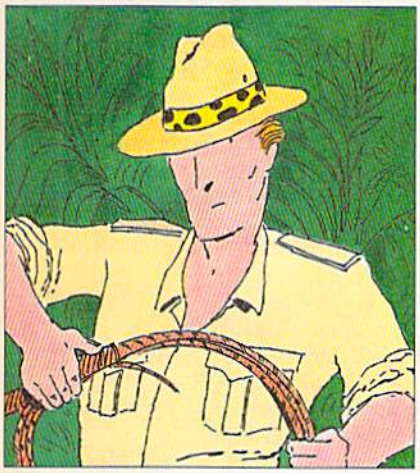
VOLUME 6, NUMBER 12 DECEMBER 1989



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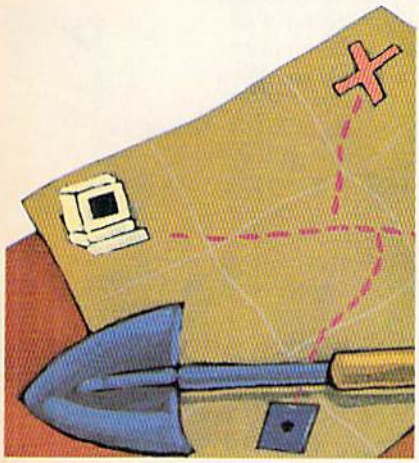

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BY ED JUDICE

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* Relax and enjoy the holidays with the family and leave the typing to us. Order the November–December 1989 ReRUN disk, which includes the programs in this and last month's issue, plus three bonus items, for $16.47. See the card at page 48.

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RUNning Ruminations

As we enter the 1990s, we can look forward to reading articles that take a look ahead at the next decade. Conjecture pieces about how our lives will change in the coming years.

But before we say goodbye to this decade, let's take a look back. Certainly, the 1980s have to be described as the decade of the home computer. And the computer of the decade has to be the Commodore 64/128. Macintosh may have controlled the spotlight, IBM has the prestige, but in terms of number of units sold, price/performance value and longevity, Commodore is the computer king.

The home computer was *Time*'s "man" of the year during this decade. But more importantly, PCs have proven that they aren't just a fad. The PC has become a valuable fixture in one out of five homes, countless businesses and thousands of schools.

Remember the 1980s, the decade of the home computer. ◆

Given this background, which major household consumer item, including home computers, do you consider to have had the most important effect on your life during this past decade? *The Wall Street Journal* recently asked this question in a nationwide poll to find out what recent invention Americans consider to have contributed most to improving their way of life. If your answer was the home computer, you would have been in the minority. Only 45 percent cited it as a product that made life a lot better. Nineteen percent consider it a "modern frill."

Would you believe that the smoke alarm was rated the biggest hit of the 1980s? Followed by the microwave oven and the coffee maker? Even the lowly TV remote control (how essential!) outpointed the home computer.

While some Americans can't live without their pulsating shower massagers, video cameras, Walkmans, CD players and car phones, most Americans consider these items frivolous and not necessary to the household.

Just about all of these items were unavailable prior to the 1980s. Ten years from now most of these products will have become obsolete, or at least have been replaced in importance by other items.

What products will be the stars of the 1990s?

The simple smoke detector will be replaced by an elaborate home control system that regulates the lights, heat and security systems, as well as air purification and smoke detection. The home computer as we know it will probably be replaced by the wristwatch-sized computer.

How about a computer that mimics human functions and "hears" to interpret messages or "reads" handwriting?

Industry experts predict that we're poised for yet another computer revolution. Just as the personal computer dramatically changed the way we work, play, learn and create in the 1980s, the coming decade promises even greater change. Stay tuned for multimedia, the next major development in the computing arena. Adding high-quality sound and video capability to PCs represents a major new market, especially in the area of "edutainment."

Let the 1990s begin.

Dennis Brisson

Dennis Brisson
Editor-in-Chief

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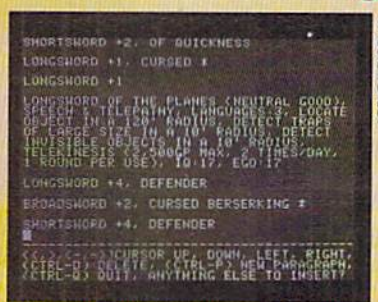
SHORTSWORD +2, OF QUICKNESS
LONGSWORD +1, CURSED
LONGSWORD +1
LONGSWORD OF THE PLANES (NEUTRAL GOOD), SPEECH, TELEPATHY, LANGUAGES, LOCATE OBJECT IN A 120' RADIUS, DETECT TRAPS OF LARGE SIZE IN A 10' RADIUS, DETECT INVISIBLE OBJECTS IN A 10' RADIUS, TELEKINESIS (5,500GP MAX, 2 TIMES/DAY, 1 ROUND PER USE), IQ:17, EGO:17
LONGSWORD +4, DEFENDER
BROADSWORD +2, CURSED BERSERKING
SHORTSWORD +4, DEFENDER
CURSOR UP, DOWN, LEFT, RIGHT,
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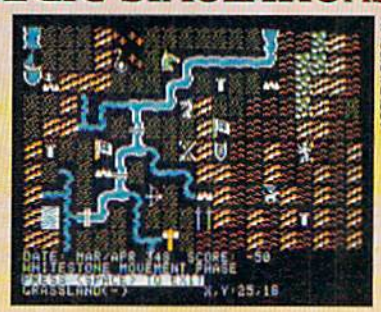
CTRL-Q: QUIT, ANYTHING ELSE TO INSERT
APPLE II DISPLAY



APPLE II DISPLAY

IBM DISPLAY

MAGIC

Protect your programs from prying eyes, save scores of your games and move big chunks of memory instantaneously on your C-64.

Compiled by TIM WALSH

$561 C-64 Character Color to Cursor Color Changer

One of the most eye-catching routines in the world of C-64 programming also has one of the longest, descriptive names in Magicdom. C-64 Character Color to Cursor Color Changer does just that—it instantly changes all of the characters displayed on the screen to the current cursor color.

A completely relocatable machine language routine, C-64 Character to Cursor Color Changer can be used as a standalone program or as a routine within a program. Activating it with its default memory location requires entering SYS 49152 after changing the cursor color with either POKE 646,X or with the control or Commodore keys.

```
Ø REM 64 CHARACTER COLOR TO CURSOR COLOR C
  HANGER - LARRY E. SUTTER          :REM*111
1Ø FORT=49152 TO 492ØØ:READ D:POKE T,D:CK=
  CK+D:NEXT                         :REM*23Ø
2Ø IF CK<> 7149 THENPRINT"ERROR IN DATA...
  ":END                             :REM*225
3Ø PRINT"{SHFT CLR}ACTIVATE COLOR CHANGE W
  ITH SYS 49152"                    :REM*43
4Ø DATA 173,134,2,162,141,142,252,3,162,96
  ,142,255,3,162,216,16Ø,Ø,142      :REM*192
5Ø DATA 254,3,14Ø,253,3,32,252,3,2ØØ,192,Ø
  ,24Ø,6,192,232,24Ø,7,2Ø8,236      :REM*51
6Ø DATA 232,224,Ø,2Ø8,231,224,219,24Ø,2,2Ø
  8,225,96                          :REM*253
```

—LARRY E. SUTTER, STERLING HEIGHTS, MI

$562 Score Keeper 64/128

If you're an avid game programmer, you can save the top five scores for your C-64 and C-128 games to disk by incorporating Score Keeper 64/128 into them. If you run the program and don't yet have a score file, it automatically writes a top-five score on the disk for you.

The guidelines to follow when using Score Keeper 64/128 are simple. NM$ is the current player; the current player's score is the variable SC; the top five scores in line 10 go from highest to lowest; and bear in mind that it won't accept names over 14 characters long.

```
Ø REM SCORE KEEPER 64/128 - JERRY DICKSON
                                    :REM*44
1Ø NM$="NO ONE YET!":S1=5:S2=4:S3=3:S4=2:S
  5=1                               :REM*254
2Ø IFLEN(N$)>14ORLEN(NM$)>14THENPRINT"NAME
   TOO LONG!":RUN                   :REM*157
3Ø PRINT"{SHFT CLR}{CTRL 2}":OPEN 2,8,2,"H
  IGH,S,R":GOSUB28Ø                 :REM*89
4Ø OPEN 2,8,2,"HIGH,S,R"            :REM*69
5Ø FORL=1TO5:INPUT#2,H(L):INPUT#2,I$(L):NE
  XTL:CLOSE2                        :REM*19Ø
6Ø FORL=1TO5:F(L)=H(L):J$(L)=I$(L):NEXTL
                                    :REM*2Ø4
7Ø IFSC<F(5)THEN13Ø                 :REM*89
8Ø IFSC>F(1)THENGOSUB23Ø:GOTO13Ø    :REM*1Ø9
9Ø IFSC>F(2)THENGOSUB24Ø:GOTO13Ø    :REM*72
1ØØ IFSC>F(3)THENGOSUB25Ø:GOTO13Ø   :REM*167
11Ø IFSC>F(4)THENGOSUB26Ø:GOTO13Ø   :REM*13Ø
12Ø GOSUB27Ø                        :REM*2Ø4
13Ø PRINT"{SHFT CLR}{2 CRSR DNs}";SPC(14)"
  HIGH SCORES":PRINTSPC(14)"{11 COMD Ys}
  ":PRINT                           :REM*86
14Ø FORL=1TO5:PRINT"":PRINTTAB(11);I$(L);T
  AB(25);H(L):NEXTL                 :REM*192
15Ø OPEN 15,8,15,"SØ:HIGH":CLOSE15:REM*156
16Ø OPEN 2,8,2,"HIGH,S,W":FORL=1TO5:PRINT#
  2,H(L):PRINT#2,I$(L):NEXTL:CLOSE2
                                    :REM*11
17Ø PRINT"{2 CRSR DNs}":A$=" PRESS ANY KEY
   TO CONTINUE "                    :REM*8
18Ø GETB$:IFB$=""THENGOSUB2ØØ:GOTO18Ø
                                    :REM*1Ø2
19Ø END                             :REM*63
2ØØ PRINT"{CRSR UP}"TAB(7);"{CTRL 9}";A$:F
  ORP=1TO1ØØ:NEXT                   :REM*1Ø6
21Ø PRINT"{CRSR UP}"TAB(7);"{CTRL Ø}";A$:F
  ORP=1TO1ØØ:NEXT                   :REM*123
22Ø RETURN                          :REM*1Ø7
23Ø H(1)=SC:I$(1)=N$:FORL=2TO5:H(L)=F(L-1)
  :I$(L)=J$(L-1):NEXTL:RETURN       :REM*2Ø
24Ø H(2)=SC:I$(2)=N$:FORL=3TO5:H(L)=F(L-1)
  :I$(L)=J$(L-1):NEXTL:RETURN       :REM*193
25Ø H(3)=SC:I$(3)=N$:FORL=4TO5:H(L)=F(L-1)
  :I$(L)=J$(L-1):NEXTL:RETURN       :REM*247
26Ø H(4)=SC:I$(4)=N$:H(5)=F(4):I$(5)=J$(4)
  :RETURN                           :REM*212
27Ø H(5)=SC:I$(5)=N$:RETURN         :REM*148
28Ø CLOSE2:OPEN 15,8,15:INPUT#15,E,E$:CLOS
  E15:IFE<>ØTHEN3ØØ                 :REM*168
29Ø RETURN                          :REM*177
3ØØ H(1)=S1:H(2)=S2:H(3)=S3:H(4)=S4:H(5)=S
  5:FORL=1TO5:I$(L)=NM$:NEXTL:RETURN
                                    :REM*156
```

—JERRY DICKSON, SANDWICH, IL

$563 1541 Disk Dater

Classify all of your work disks by the year of their creation

or their updating with 1541 Disk Dater. A C-64 mode program, Disk Dater writes the last two digits of the year to an unused portion of the disk directory where it is prominently displayed each time the directory is listed. It defaults to 89, but prompts you to change that to any year desired.

As with any disk header manipulator program, it is better to be safe than sorry, so use this program carefully. Test it thoroughly on non-essential scratch disks before using, and, to avoid potential problems, don't use it on 1571-formatted disks.

```
Ø REM 1541 DISK DATER - RICHARD PENN
                                    :REM*1Ø6
1Ø PRINTCHR$(147)CHR$(18)"1541 DISK DATER
   - RICHARD PENN"                  :REM*56
2Ø CLOSE 15:OPEN 15,8,15:PRINT#15,"IØ":CLO
   SE2:OPEN2,8,2,"#"                :REM*2Ø5
3Ø PRINT#15,"U1:2,Ø,18,Ø":PRINT#15,"B-P:2,
   164"                             :REM*117
4Ø FOR T=1TO3:GET#2,A$:C$=C$+CHR$(ASC(A$+C
   HR$(Ø))):NEXT                    :REM*41
5Ø PRINT:PRINT:POKE 212,1:PRINT"PREVIOUS C
   ONTENTS: "C$                     :REM*18Ø
6Ø POKE 19,1:INPUT"CHANGE TO{8 SPACEs}: '8
   9{3 CRSR LFs}";N$:POKE 19,Ø:PRINTN$=LEF
   T$(N$,3)                         :REM*1Ø3
7Ø PRINT#15,"B-P:2,164":PRINT#2,N$;:PRINT#
   15,"U2:2,Ø,18,Ø":CLOSE8          :REM*24
8Ø INPUT#15,ER,ER$:PRINT:PRINT:PRINT"DISK
   STATUS:"ER;ER$:PRINT#15,"IØ":CLOSE15
                                    :REM*214
```

—Richard Penn, Montreal, Quebec, Canada

$564 Effective C-64/C-128 Program Protection

A little-known program protection method allowed by the C-64 and C-128 requires two and four Pokes, respectively, to keep unwanted eyes from scanning your Basic programs.

With the C-64, it's simply a matter of entering the following commands in the proper sequence. When you're ready to save a C-64 program to be encrypted to disk, just enter POKE 2050,0. When the program is re-loaded into the C-64, it won't list or work properly. Just enter POKE 2050,8 to restore the program to pristine condition.

C-128 programs can be protected in a similar manner, but it's a little more complex. First, enter the following two Pokes before saving: POKE 7169,0:POKE 7170,0. To revive the now "dead" C-128 program after reloading it into the computer, enter POKE 7169,36:POKE 7170,28. But unlike the C-64, you're not out of the woods yet. The final step is to enter RENUMBER in Direct mode, which may change the original ►

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Circle 166 on Reader Service card.

line numbering, but the program will then work fine.

—BRIAN DAVIDSON, POMPANO BEACH, FL

$565 64/128 CLEAR SCREEN DIRECTORY

C-128/1571 disk drive users, you're not forgotten. Here's a 64/128-compatible Magic Trick that clears the screen in any mode whenever the directory is listed. Just format a new disk with either a 1541 or 1571 (even a 1581!) using the following technique:

```
OPEN 15,8,15,"N0:"+CHR$(13)+CHR$(147)+
CHR$(18)+CHR$(34)+"diskname,id":CLOSE15
```

—RICHARD PENN, MONTREAL, QUEBEC, CANADA

$566 64 RAM CACHE

Move large chunks of data instantly on your C-64 with 64 RAM Cache. This relocatable machine language program can move memory from either Direct or Program mode. The required syntax for a memory movement after running 64 RAM Cache is straighforward using this format:

```
SYS 49152,S,E,L
```

where S is the starting address of the memory to be moved, E is the ending address and L is the starting address of the new location.

```
Ø REM 64 RAM CACHE - DAVID FICKEN :REM*156
1Ø FORI=49152TO49239:READA:POKEI,A:X=X+A:N
   EXT                              :REM*43
2Ø IFX<>14313THENPRINT"ERROR IN DATA...":E
   ND                               :REM*1Ø7
3Ø DATA 32,253,174,32,138,173,32,247,183,1
   32,251,133,252,32,253,174,32     :REM*42
4Ø DATA 138,173,32,247,183,14Ø,254,2Ø7,141
   ,255,2Ø7,32,253,174,32,138       :REM*163
5Ø DATA 173,32,247,183,132,253,133,254,16Ø
   ,Ø,177,251,145,253,24,165,251    :REM*54
6Ø DATA 1Ø5,1,133,251,165,252,1Ø5,Ø,133,25
   2,24,165,253,1Ø5,1,133,253       :REM*43
7Ø DATA 165,254,1Ø5,Ø,133,254,165,251,2Ø5,
   254,2Ø7,2Ø8,219,165,252,2Ø5      :REM*159
8Ø DATA 255,2Ø7,2Ø8,212,96          :REM*244
```

—DAVID M. FICKEN, TOPSAIL, NFLD., CANADA

$567 64 LINES AND BYTES

Are you curious about exactly how many keystrokes it took you to type in finger blister-inducing programs such as RUN Paint (March 1989) or RUN Shell (July 1989)? Just load and run this C-64 mode program called 64 Lines and Bytes, then load the Basic program or loader of choice and enter SYS 49152 in Direct mode.

The first number that appears is the number of lines in the program, and the second number is the number of bytes, or characters, contained in the listing.

```
Ø REM 64 LINES & BYTES - DAVID FICKEN
                                    :REM*145
1Ø FORI=49152TO49252:READA:POKEI,A:X=X+A:N
   EXT                              :REM*227
2Ø IFX<>16253THENPRINT"ERROR IN DATA...":E
   ND                               :REM*149
3Ø DATA 16Ø,Ø,177,43,133,251,2ØØ,177,43,13
   3,252,169,Ø,141,254,2Ø7,141      :REM*12
4Ø DATA 255,2Ø7,16Ø,Ø,165,251,2Ø8,4,165,25
   2,24Ø,39,165,251,133,253,165     :REM*167
5Ø DATA 252,133,254,24,173,254,2Ø7,1Ø5,1,1
   41,254,2Ø7,173,255,2Ø7,1Ø5,Ø     :REM*1Ø9
6Ø DATA 141,255,2Ø7,177,251,72,2ØØ,177,251
   ,133,252,1Ø4,133,251,76,19       :REM*2Ø
7Ø DATA 192,174,254,2Ø7,173,255,2Ø7,32,2Ø5
   ,189,169,32,32,21Ø,255,56,165    :REM*156
8Ø DATA 253,229,43,17Ø,165,254,229,44,32,2
   Ø5,189,169,33,32,21Ø,255,96      :REM*59
```

—DAVID M. FICKEN, TOPSAIL, NFLD., CANADA

$568 1K RAM C-64 EXPANDER

1K RAM Expander is a C-64 program that provides 1228 bytes of additional Basic memory. When you run it, PRINT FRE(0)+2↑16 reveals 40137 bytes free instead of the usual 38909. Some dynamic memory reconfigurations make this possible.

The program reconfigures memory by moving screen memory to locations 49152 through 50151 and sprite pointers to 50168 through 50175. Sprites must be stored at locations 49152 through 65535 and the character set at locations 57344 through 61439. Basic memory now runs from 828 to 40959, making larger programs possible.

```
Ø REM 64 1K RAM EXPANDER - RICHARD PENN
                                    :REM*36
1Ø POKE 56334,Ø:POKE 1,51:POKE 781,16:POKE
   782,255:POKE 9Ø,Ø:POKE 91,223    :REM*166
2Ø POKE 88,Ø:POKE 89,239:SYS 41964:POKE 1,
   55:POKE 56334,1                  :REM*252
3Ø POKE 56578,PEEK(56578)OR3        :REM*2
4Ø FOR U=679 TO 693:READ Q:POKE U,Q:CK=CK+
   Q:NEXT                           :REM*123
5Ø IF CK <> 1777THENPRINT"ERROR IN DATA...
   ":END                            :REM*23
6Ø DATA 72,169,148,141,Ø,221,169,9,141,24,
   2Ø8,1Ø4,76,131,164               :REM*117
7Ø POKE 77Ø,167:POKE 771,2:POKE 648,49152/
   256                              :REM*41
8Ø PRINTCHR$(147)"1K RAM EXPANDER BY RICHA
   RD PENN"                         :REM*27
9Ø POKE 43,53:POKE 44,3:POKE 82Ø,Ø:NEW
                                    :REM*213
```

—RICHARD PENN, MONTREAL, QUEBEC, CANADA

$569 64 INSTANT DATA

Here is one of the fastest, shortest ways to make Basic Data statements out of any machine language program. After running the program, enter, when prompted, the range of memory where the machine language resides—a starting line number followed by a line number increment.

After 64 Instant Data does its conversion to Data statements, delete line numbers 60000 on up and save the data. You can then use the data in your own Basic programs.

```
Ø REM 64 INSTANT DATA - DAVID FICKEN
                                    :REM*11Ø
6ØØ1Ø INPUT"START ADDRESS";A:INPUT"END ADD
```

Continued on p. 80.

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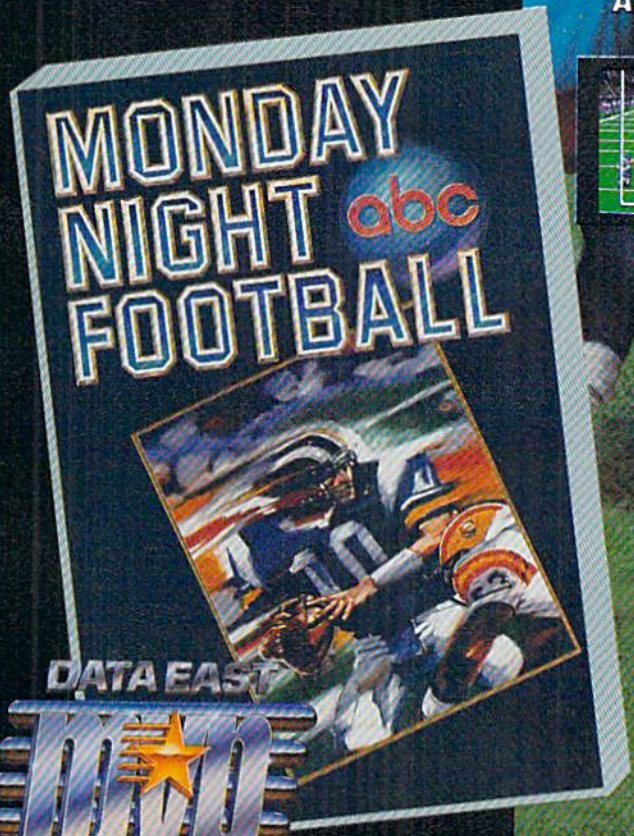

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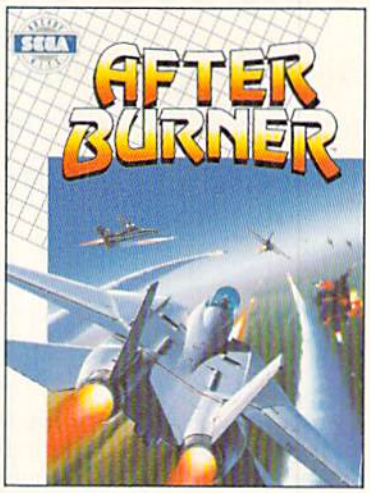
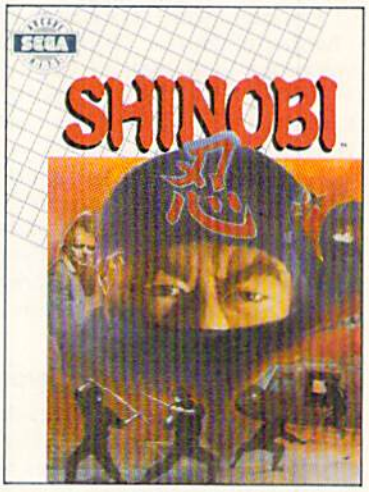


Get your adrenaline pumping—you're going to need it when you take to the skies. Because you're not going to believe what's up there! You supply the guts, the skill and the reflexes—the F-14 Thunder Cat will supply the mach 2+ speeds and the state of the art battle computer.

To evade enemy fire, you must execute difficult maneuvers including a 360° barrel roll. Getting by the Flying Fortresses isn't a simple matter—but if you succeed there's a fuel tanker to dock with. It will replenish energy and ammo.

Ok, jet jockey. Show us your true colors. Are you an ace, the top card in the deck?

SHINOBI



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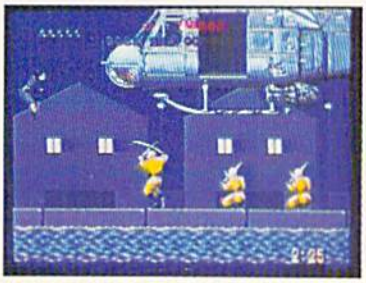

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Circle 49 on Reader Service card.

NEWS AND NEW PRODUCTS

Announcing the winners of RUN*'s Reader Choice Contest; a few non-game items enter the marketplace as, of course, do some new games.*

Compiled by HAROLD R. BJORNSEN

WHO WON?

The grand prize winner in *RUN*'s Reader Choice Contest is **Craig Moore** of Belpre, Ohio. Moore, a retired U.S. Marine and a long-time *RUN* reader, will receive over $5000 worth of entertainment software. His ballot was drawn from about 4000 entries.

Second place winner of a complete collection of ReRUN disks is **Enrique Hernandez** of Miami. **Emmit Howell** of Jacksonville, Arkansas, is the recipient of the third prize—a collection of *RUN* productivity software.

Other winners, who will be given their choice of prizes from among subscriptions to *RUN* or ReRUN or other *RUN* software, include: **Rick Rosinski** of Midland, Michigan; **Matthew Martin** of Goodlettsville, Tennessee; **Keith Chanley** of Pontiac, Michigan; **Brian Weberling** of Bristol, Virginia; **Kathy Taylor** of The Colony, Texas; **Gary Lee** of Jacksonville, Florida; and **Bill Harrop** of Largo, Florida.

RUN extends its appreciation to all the readers who voted for their favorite game software and to the manufacturers who contributed software to the grand prize. For the winning software packages, see this month's cover story.

WHAT'S THE SECRET PASSWORD?

STATEN ISLAND, NY—**Lock-It** is a C-64 disk password security system for the 1541 and 1571 disk drives to prevent unauthorized access to protected disks. The program requires a secret password, consisting of up to seven characters provided by the user to read the directory and files. There are a total of 49 characters from which to choose in creating your password. Available via mail order for $29.50, plus $4.50 s/h, from Magus Software Systems, PO Box 050256, Staten Island, NY 10305.

Check Reader Service number 405.

BEACH BALL

SAN MATEO, CA—Electronic Arts (1820 Gateway Drive, San Mateo, CA 94404) has released **Kings of the Beach: Professional Beach Volleyball** for the C-64 at $29.95. One or two players compete in a five-beach tournament in Rio, Australia, Hawaii, Chicago and San Diego. To advance in tournament play, you must win three games on each beach. After the third successive victory, you're rewarded with an Electronic Arts Pixel-Mate, which provides the secret password to move on. Computer opponents become progressively tougher as you play through 15 matches and attempt to become King of the Beach.

Check Reader Service number 401.

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HIS FEAR OF THE NET MAKES HIM AN EASY TARGET FOR THE SIX-PACK SLAM.
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Using strategy against your opponents is one way to win the volleyball tournament in Kings of the Beach.

WWII IN ONE EVENING

SUNNYVALE, CA—Strategic Simulations, Inc. (675 Almanor Ave., Sunnyvale, CA 94086) has released its newest World War II strategy game for the C-64, **Storm Across Europe**. This one- to three-player simulation lets you recreate the entire war in as little as one evening of play.

The game covers every part of the conflict in Europe from 1939 through 1945, from North Africa to Sweden, from Gibraltar to the Ural Mountains of Russia. Each game turn represents three months of action. Armies consist of units, each rated for strength and efficiency. They vary in the number of tanks, paratroops, infantry, air support and mechanized forces.

Every facet of the war can be controlled. Move armies across the map to conquer territory. Mount amphibious landings. Launch U-boat campaigns in the Atlantic. Carry out strategic bombing strikes against enemy production centers. Send raiding fleets to cripple the opponent's shipping. And drop paratroop forces on enemy positions. While the battle rages on, limited resources must be juggled between production and advanced research. Multiple scenarios and the ability to change starting levels for each country allow for endless variations. $39.95.

Check Reader Service number 403.

REASSEMBLE THE KING

SAN FRANCISCO—Britannica Software (345 4th St., San Francisco, CA 94107) has released **Eye of Horus**, a C-64 arcade game set in ancient Egypt.

Engaging the player in several levels of interaction, the game begins with you, Horus, god of all that is light and good and the son of King Osiris and Queen Isis, as heir to the throne. But your position has been usurped by your uncle Set, god of evil and night, who takes the form of a dragon. Set has slain your father and scattered his body all over the burial chamber.

Inside the confines of the maze, you must locate all the missing pieces of Osiris's body and then reconstruct the dismembered body with the help of various amulets. You will then receive the strength needed to confront Set. To complete this task, you must use all of the found weapons and amulets to increase your powers.

You travel through a series of mazes that consists of various-sized chambers and ancient mystical elevators. Within the maze, there are four different areas. Some of the elevators will be locked, blocking access to some areas. To unlock an elevator, you need to find various colored keys.

In the final area, which can be accessed with the blue key, Set will hunt you out and seek to destroy you with vicious snakes. If Set's power is less than ►

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THE HUMP BACK.
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2.

THE LITTLE RAMP.
Looks easy enough. The ramp isn't too big. But everyone wants to clear it full speed. They end up kissing dirt 100 feet down.

3.

THE STEPPING STONES.
Speed control is the name of the game — not too fast, not too slow. You'll have to clear four chasms, one after the other.

4.

THE BIG RAMP.
Build up speed for that ramp, but be ready for the landing. It'll rattle your molars. Your chassis can fall apart quickly on this one.

5.

THE HIGH JUMP.
Clearing the ramp is easy. Making it over that monstrosity in the middle is another story.

6.

THE ROLLERCOASTER.
The ride is silky smooth until you hit that slight dip in the road — all 500 feet of it.

7.

THE SKI JUMP.
For elite racers only. Handle this course right, and you're a legend. One small mistake, you're in orbit.

8.

THE DRAWBRIDGE.
This one *moves*. Catching the drawbridge at the right angle requires perfect timing. Better get it right. Second chances are for the living.

They're the meanest speedways ever designed. Like rollercoasters from Hell, they twist and climb through empty space without tracks to guide your wheels. Or guard rails to save your neck. In some sections, they don't even have roadway to carry your weight.

Your super-charged car is like a plane without wings. You have only momentum — the perfect combination of speed and steering — to carry you safely across gaping holes in the track. Airborne,

you hold on, only hoping that all four tires find the track again — and that the jolt won't be too much for you and your car to handle.

Fast-scrolling screens are so vivid they do everything but blow wind in your face. When the track rises and drops sharply away, the illusion of weightlessness runs straight to your gut. On hairpin turns, you'll find yourself leaning in your chair.

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A marketing division of MicroProse Software, Inc.
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MICROPLAY™ SOFTWARE

Can't find Stunt Track Racer? Call 301-771-1151 ext. 208 weekdays 9 am to 5 pm Eastern Time and order by MC/Visa/AmEx. Or mail check or money order for $39.95 for Atari ST or Amiga versions; $34.95 for IBM-PC/Tandy/compatibles (specify disk size); $29.95 for C-64/128. MD residents add 5% sales tax. Free shipping in US; $5 international. US funds only.

your own, he will retreat. To force a conflict situation, you must corner him in a dead end. $29.95.

Check Reader Service number 404.

Not a Fretless Tutorial

OAK CREEK, WI—**Guitar Tutor** is an interactive music instruction program for beginning guitar students. The large fretboard graphic and lesson format enables the C-64 or C-128 to become a music instructor, and the student has the advantage of learning chords, scales, music theory and familiar songs at his or her own pace. Available for $29.95 from Northern Star Software, PO Box 63, Oak Creek, WI 53154.

Check Reader Service number 407.

Taking Inventory

MESQUITE, TX—The **CMS Inventory System** for the C-128 holds up to 1500 items. It lets you design reports and set colors, and it has a point-of-sale program that prints your customers' invoices, handling both charge and cash sales. In addition, it "batch enters" invoices for later printing. With one or two disk drives and printers, it also prints all reports, including inventory lists, on-order reports, sales analysis reports, transaction summaries and audit trail reports.

The FileGuard feature prevents data loss, even if the electricity goes off. The package includes sample files, startup instructions, a complete tutorial, on-screen instructions, and daily, monthly, quarterly and yearly operations outlines. It retails for $79.95 from CMS Software Systems, 2204 Camp David, Mesquite, TX 75149.

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A Different Point of View

COSTA MESA, CA—SportTime Computer Software (3187-G Airway Ave., Costa Mesa, CA 92626) announces the **Side-View Game Option Module** for the company's Omni-Play Basketball game. From this new perspective and playing mode, you see every second of hoop action from the eye of a television camera following the ball left to right, down the court and back again. In addition to coaching, you now lead the team as its center at all times. You can run anywhere on the court, set picks and call for the ball, and your teammates will give it to you whenever you want. Double- and triple-team options are even possible. It's available for the C-64 for $19.95.

Check Reader Service number 402.

Look Ma, No Hands!

MOUNTAIN LAKES, NJ—R. F. St. Louis Associates (PO Box 232, Mountain Lakes, NJ 07046) has released **Automater**, a single power switch that controls your computer system. The unit, which is plugged into a wall outlet, senses when your computer is turned on, and then, after a two-second delay, turns on the power to the system's peripherals, eliminating the nuisance of having to turn each peripheral on individually. It's available for $39.95 plus $2.50 s/h.

Circle Reader Service number 408. ■

Excellence ...
for the **Commodore**

Lt. Kernal – a 20 or 40 Megabyte Hard Drive which supports CPM, includes enhanced system commands, and is expandable, configurable, & *FAST!* Great for BBS operation.

Super Graphix GOLD – the ultimate printer interface which supports 128 FAST serial and includes a 32K buffer, 4 built-in fonts, 4 downloadable fonts, and a utility disk with 27 fonts.

Super Graphix – an enhanced printer interface which has NLQ built in and includes an 8K buffer, 2 downloadable fonts, reset button, and a utility disk with 27 fonts.

Super Graphix jr – an economical printer interface with NLQ built in and includes 10 printing modes, graphics, and easy operation.

FontMaster II – a powerful word processor for the C-64 with 30 fonts ready to use, 65 commands, font creator, data merging, super- and subscripting, italicizing and more.

FontMaster 128 – a super word processor for the 128 with 56 fonts ready to use including foreign language fonts, on-screen font preview, 4 column printing, a 102,000-word spell checker and much more.

The ***Xetec*** Product Family for the Commodore C64® and 128® .
The name that spells *Quality, Affordability,* and *Reliability*
All Hardware is FCC Certified All Interfaces include a Lifetime Warranty
Commodore C64 and 128 are registered trademarks of Commodore Business Machines, Inc.
Xetec, Inc. 2804 Arnold Rd. Salina, KS. 67401 (913) 827-0685

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"I Challenge You To Win A Caribbean Vacation!"

—Major "Wild Bill" Stealey
President, MicroProse

Enter "The Major's Mission" Contest and take off to the Caribbean!

Just ask your retailer for details on how to receive your Top Secret documents. They contain your mission orders and a tough set of questions on four of our hottest games: F-19 STEALTH FIGHTER, RED STORM RISING, F-15 STRIKE EAGLE II and M1 TANK PLATOON. To find the answers, read through your documents. Then send in your answers to win!

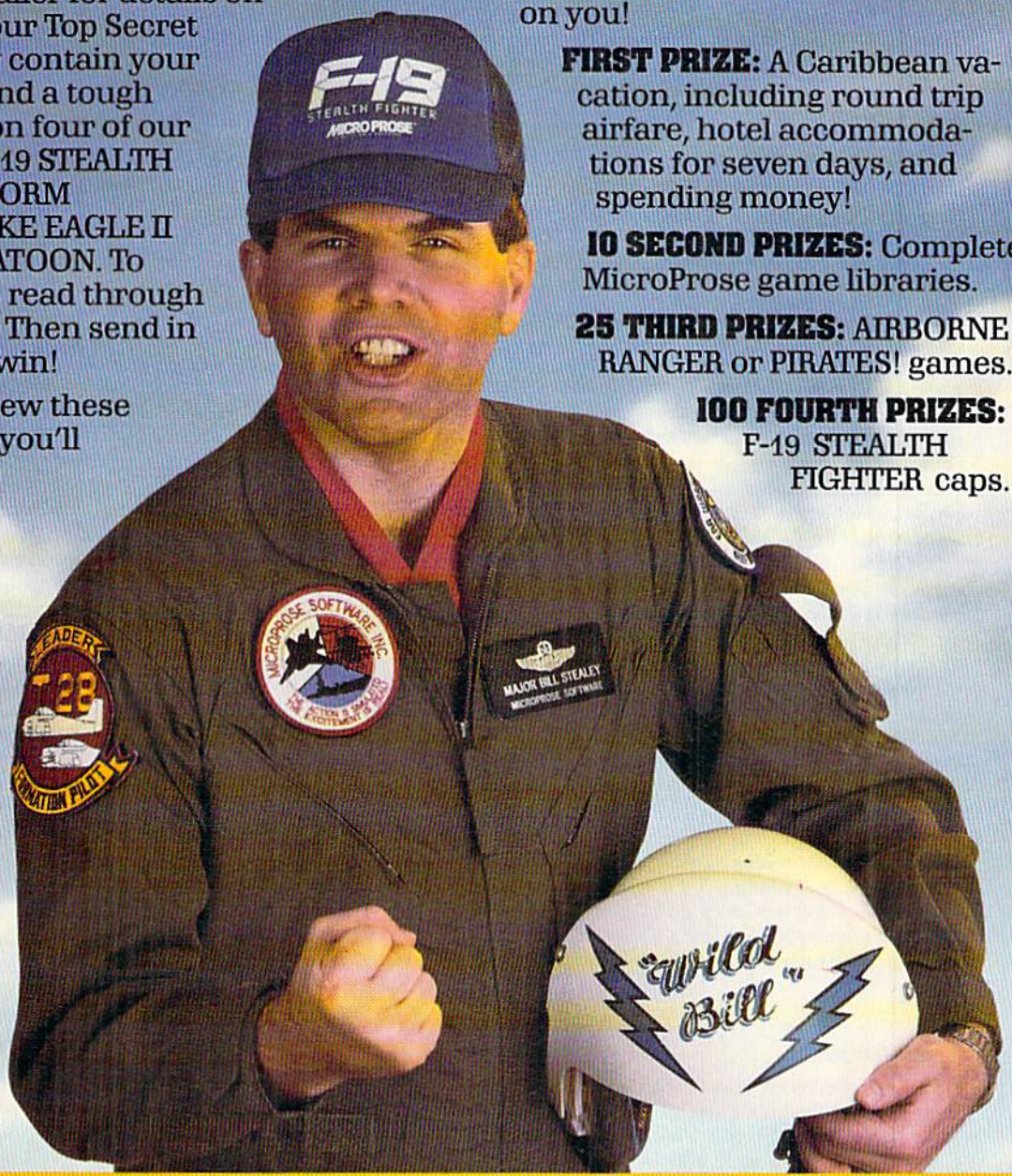
You'll get to preview these four games, plus you'll have the chance to win a fabulous Caribbean vacation, or one of 135 other awesome prizes! So enter now. The Major is counting on you!

FIRST PRIZE: A Caribbean vacation, including round trip airfare, hotel accommodations for seven days, and spending money!

10 SECOND PRIZES: Complete MicroProse game libraries.

25 THIRD PRIZES: AIRBORNE RANGER or PIRATES! games.

100 FOURTH PRIZES: F-19 STEALTH FIGHTER caps.



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Get Ready! Contest Starts November 1, 1989!

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MAIL RUN

A former Commodore user speaks out, and two readers lambaste those who bad-mouth Commodore products.

COMMODORE VS. THE CLONES

Your editorial suggesting that IBM-clone owners lack enthusiasm for their machines is laced with the same overtones of blind fanaticism seen in similar hype from Texas Instruments groups. Sort of makes me wonder if you might drive an Edsel.

I've grown ever more concerned as I've watched Commodore and magazines like yours constantly increase the promotion of games while the rest of the computer industry focused on more adult applications.

Commodore-specific magazines slowly and relentlessly have been digging their own graves with game after game, never seeming to realize that children grow up and want computers with serious applications software. The clones offer the serious user all the speed, memory and data storage they can reasonably ask for, and abundant software to run on them.

So, if you only want to play games or turn on your lawn sprinklers, Commodore is the way to go. But if you have a need for serious computer use, run to the nearest clone dealer and see a whole new world of computing possibilities open before your eyes, with prices and features unmatched, even by Commodore's own IBM clones.

—GARY DAVIDSON
VACAVILLE, CA

You have an interesting hypothesis, Gary, and one we hadn't considered: the relationship between Edsel ownership and Commodore ownership. Maybe readers will respond to this or other comments in your letter.

—EDITORS

SHOP AROUND!

I have just about had it with all of these people who knock a good product (Mail RUN, August 1989). I bought my C-64 about a year ago, and it works quite well. I researched the various methods of buying this wonderful computer, as all intelligent buyers do when shopping. Those weeping fly-by-night buyers who will switch to another brand at the drop of a hat do not interest me. They never shop around. I am pleased with my computer and plan many years of use with it. To all of you who have recurrent Commodore problems, next time, shop around.

—DAVID A. SIMON
WONDER LAKE, IL

I can no longer stand by and see people bad-mouth in print the good Commodore products that I have used for many years. The only troubles that I ever had with my C-64 and C-128 were ones that I brought on by misuse or neglect.

—CLYDE E. CORSON
LAWNDALE, CA

In Mail RUN in the August issue, I note that most of the letters are of the "poor me" type. While I do agree that Commodore's support of the 128D has been less than one might hope for, there is no sense in crying about something over which you have no control.

I strongly urge those who have had things go wrong with their computer, power supply or disk drive to put in the claim if it is still under warranty, but to be prepared to get it fixed on the outside with a reliable concern and hold them responsible for the repair. I also suggest that the local computer club is a good place to find your local fixer, as others most problably have had the same problem and can tell you which shop is the better one to do business with.

As to the lack of software—again, the local club is the place to go for information on what's new and hot. Most clubs' libraries are loaded with goodies just waiting to be discovered.

—RALPH S. LEES, JR.
NEW YORK, NY

"I'D RATHER SWITCH THAN FIGHT" REDUX

After reading Mr. Lowen's letter, "I'd Rather Switch Than Fight" (Mail RUN, August 1989), I'm contemplating going the same way. It's difficult to get a hard disk drive and too much trouble getting a good compatible printer to work right. I'm planning to switch to an IBM PC this year. I'll still keep my Commodore system mainly because I have too much money tied up in software. Sorry it has to be that way.

—ROSS H. BELT
OAKLAND, CA

If you'd still like a good hard disk drive for your Commodore, look into the Lt. Kernal from Xetec, Inc., 2804 Arnold Rd., Salina, KS 67401.

For a good compatible printer, refer to November's feature article on printers.

—EDITORS

GETTING LONELIER

Editor-in-chief Dennis Brisson's editorial comments (RUNning Ruminations, October 1989) on the disappearance of non-game software were very timely for us. We had just sent out for beta testing our Tax Command program for 1989 taxes, updated based on preliminary IRS forms and with three more schedules added. So we feel the C-64 and 128 markets are worthy of continued investment.

But I must admit that it is getting lonelier in the Commodore applications software market. Most of our competitors of a few years ago have disappeared.

I think the Commodore market has self-destructed to some extent. The very low prices on much of the software has tended to promote game software development, where there is little expectation of continued customer support and improvement.

—BRUCE R. THOMPSON
PRES., PRACTICAL PROGRAMS
MILWAUKEE, WI

FROM SQUARE DANCES TO WATER METERS

The following are the major documents I routinely maintain in support of my community and personal computering. Probably nothing individually is worthy of being singled out for special attention (see "Sculptor, Lawyer, Editor-in-Chief," RUN, August 1989), but the overall effort reflects the ►

Burt's in deep trouble.

2,000 feet below the sea, he's being hunted by the Soviets. And he's smiling. Because Burt's immersed in Red Storm Rising, the thrill-packed strategy game of submarine warfare, based on the best-selling novel by Tom Clancy.

As captain of a U.S. nuclear attack submarine, you're at war with the rampaging Warsaw Pact. Only you have the know-how and weapons to stop them.

To find and destroy Soviet subs, helicopters and surface ships, you must remain undetected. You'll need every trick you know to survive this deadly game of ambush and evasion.

After dinner, Burt Delaney will captain a U.S. nuclear sub, sink two Soviet destroyers, win the Navy Cross and save the free world.

Just for fun.

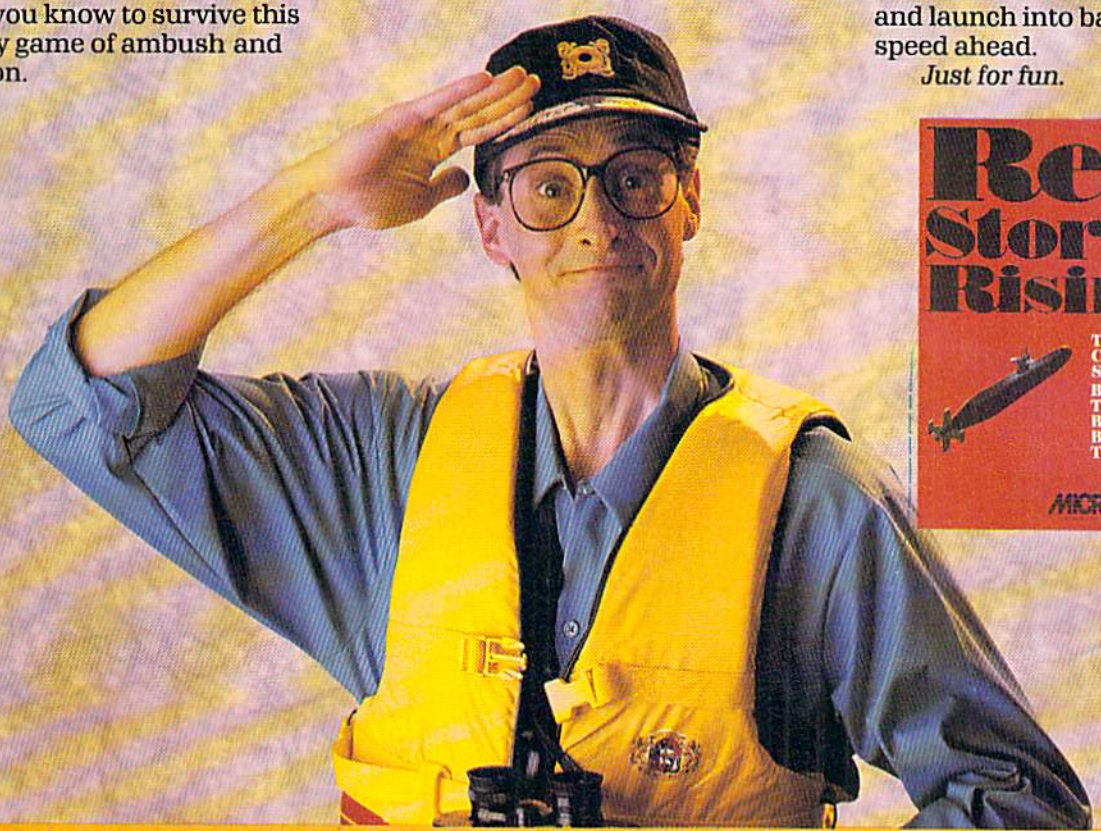
You can start with a training program, then choose one of four skill levels, from beginner to ultimate, moving up as your tactical abilities improve. You'll select from four time periods, each with different weapons systems. And you can command any of five types of subs in three major battle scenarios. You'll even see the map of Western Europe change as you repel the Warsaw Pact!

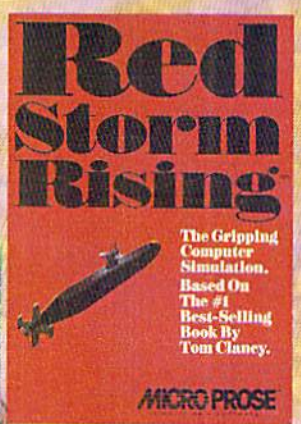
A bomb explodes in the Kremlin - not the work of Western terrorists, but the climax of a Soviet campaign to confuse the NATO alliance on the eve of their surprise attack!

All with the quick thinking and non-stop action that make us the first, last and best name in combat simulations.

Climb into Red Storm Rising and launch into battle full speed ahead.

Just for fun.





Watch for "The Major's Mission" Contest coming to your favorite retailer November 1!

Can't find Red Storm Rising? Call (301) 771-1151 x208, weekdays 8:30 am to 5:30 pm Eastern Time and order by MC/Visa/AmEx; or mail check/money order for $54.95 (specify disk size). U.S. funds only. MD residents add 5% sales tax. MicroProse Software, Inc.; 180 Lakefront Drive; Hunt Valley, MD 21030. *For IBM-PC/XT/AT/PS2/Tandy/Compatibles. Requires 384k RAM. Supports MCGA/VGA, EGA, CGA and Hercules graphics.*

MICRO PROSE™
Just For Fun.

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many fine capabilities of the C-128.

I keep a directory of over 120 records and a mailing list of our square dance club; for our 70-member service club, I also maintain a directory in addition to a newsletter, board-meeting agenda and a two-page form for documenting weekly meetings; for the Water Association, I generate a bi-monthly spreadsheet and 3-D bar chart showing each meter's usage for the past three years; a 13-page roster of museum donators; family group and blank forms for genealogy purposes; and a standard form for documenting data (20 topics) in estate management.

—WILLIAM H. CLARK
LYNDEN, WA

GOLFING, INVESTING, COLLECTING AND RACING

Besides word processing, printing chores and game playing, I also use my C-128 to prepare the monthly events calendar for our golf club, calculate statistics, standings and handicaps and publish a weekly newsletter. In addition, I calculate and keep a variety of my personal golf statistics, track a modest investment portfolio, and index and catalog a 1700-item music collection.

Oh, yes—addressing the question of speed, hook the C-128 up to a 1750 RAM expander and GEOS, and watch it go! There's a Big Blue PS 2 Model 30 in the office, and, under certain conditions, I'll put it up against my 128 anytime.

—CARL "BUDDY" GROHS
BAY MINETTE, AL

CIRCUMVENTING A GEOBUG

GEOS users need to be notified that there is a major bug in the geoPublish program.

When you go to Zoom mode and the zoom window encompasses a portion of a document while in page graphics, the program presents a dialogue box informing the user that the text file is not present. Clicking on OK causes the program to crash and locks up the keyboard. To circumvent this, users should put their text files on the same disk with the geoPublish document.

—KEVIN R. MOORE
EPHRATA, WA

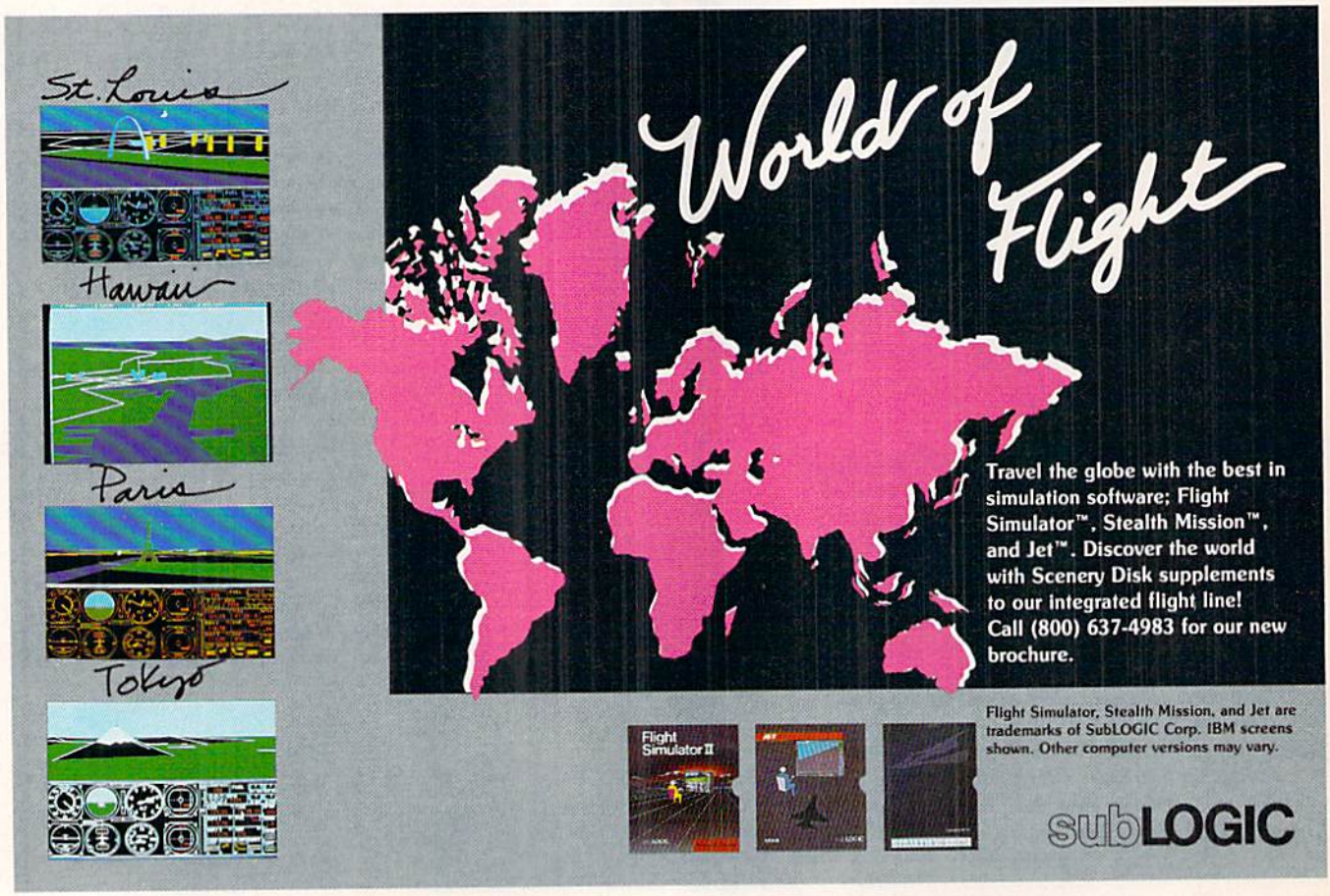
Berkeley Softworks informs us that the bug should be fixed in the next release of geoPublish.

—EDITORS ■

A CALL TO READERS

This page is your stage, so stand up and say a few words. Extend praise, air grievances or offer hands-on advice and information.

Send your letters to Mail RUN, 80 Elm St., Peterborough, NH 03458. Each letter must include the writer's name and complete address. RUN *reserves the right to edit letters for style, clarity and space.*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World of Flight
Travel the globe with the best in simulation software; Flight Simulator™, Stealth Mission™, and Jet™. Discover the world with Scenery Disk supplements to our integrated flight line! Call (800) 637-4983 for our new brochure.
Flight Simulator II
Flight Simulator, Stealth Mission, and Jet are trademarks of SubLOGIC Corp. IBM screens shown. Other computer versions may vary.
subLOGIC

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ALL NEW FOR YOUR 1989 TAX RETURNS!
Prints Out IRS-Approved Forms & Schedules

SWIFTAX™ . . .

EVEN IF YOU'VE NEVER PREPARED A TAX RETURN, SWIFTAX MAKES IT EASY TO DO YOUR OWN –*AND KEEP MORE OF WHAT YOU EARN!*

Step-by-step, line-by-line, SWIFTAX guides you through your Federal tax returns, and instructs you on which forms you must complete. This software program contains an abundance of Help Screens (which you'll find right in the program) that make SWIFTAX so easy to use, *you may not need the manual!*

SPECIAL OFFER
THE PRICE WATERHOUSE "PERSONAL TAX ADVISER"
Tax Information & Planning Guide
Details inside every package

- **Prints out itemized lists of interest, dividends, etc., for submission to the IRS and for personal records.**
- **Sets up unique Taxpayer Files,** enabling you to make changes to your completed tax returns at a later date.

Features:

- **Guides you through every step of the tax preparation process** and instructs you on which forms you must complete.
- **Quickly performs all calculations,** including specially-designed worksheets and entries, with the tax tables stored in the program.
- **Automatically checks your tax alternatives,** and calculates the lowest amount of income tax you must pay.
- **Calculates and completes the most commonly used supporting schedules—1, 2, A, B, C, D, E, F, R, SE, and Forms 2106, 2441, 3903, 4562, 6251, 8615, and 8814—stores the totals, and automatically enters this information onto your forms 1040, 1040A, or 1040EZ.***
- **Prints your tax information directly onto IRS forms 1040 and 1040A. Printouts for all other supporting forms and schedules are IRS-approved.**

A special HELP! Screen summarizes the new 1989 tax law changes, at the press of a key.

This Program Also Includes:

- **A Multi-function Calculator,** at your command at the press of a key.
- **Swiftkeys:** Provides instant access to any forms and schedules included in your tax return.
- **Context Sensitive HELP! Screens:** Just press a key and you'll be guided through the program with easy to understand instructions.
- **Timeworks Exchange Policy:** Allows you to purchase the 1990 SWIFTAX at half price.

For
- Apple 11e, 11c, 11c Plus, IIGS **$69.95**
- Commodore 64, 64c, C128 . . . . . **$49.95**

TIMEWORKS®

444 Lake Cook Rd., Deerfield, IL 60015-4919
708-948-9200

Find SWIFTAX at your local dealer or order direct from Timeworks. Just call:

708-948-9202

With Timeworks You Get A MONEY BACK GUARANTEE

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*Commodore version does not complete Forms 3903, 4562, 6251, and Schedule E

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SOFTWARE GALLERY

This Christmas, give your Kriss Kringle a gift of mystery, arcade, sports or fantasy role-playing software.

Compiled by BETH S. JALA

SPEEDBALL ..... A+

Futuristic Fun in This Free-for-All Sport

Set in the 21st century, Speedball is part soccer, part basketball and part hockey, with a measure of extra violence added in. All these elements have been skillfully combined into one exceptionally entertaining computer game.

You begin a session by choosing one of three five-man teams, each with different degrees of power, skill and stamina. The program gauges the stamina level with on-screen meters and penalizes a player whose energy has ebbed too low during a match.

The action takes place in an enclosed, rectangular arena. Scattered on the playing field are bounce domes and warp tunnels, which make the steel game ball fly in some unexpected directions. Centered at the arena's ends are the two goal mouths.

Using a joystick during the timed matches, you knock down anyone who tries to stop the march of your men toward your adversary's goal. On defense, you guide your goalie to block incoming shots.

You can increase the above-mentioned attributes with tokens that randomly appear during a match. Other on-screen markers let you pull dirty tricks, like freezing your opponent's team or reversing his or her joystick control.

While the program can track and save the results of up to 100 matches between two human players, it also includes two ways for an individual to compete against the computer. In the One-Player Knockout, there are ten progressively difficult rounds. To advance in this elimination tournament, you must do at least as well as your electronic opponent in each round's three matches.

The second solo competition is the One-Player League, which has a season of from ten to 100 weeks. A team earns five points for each goal, 20 for a draw and 100 points for every win. If you have one of the eight highest cumulative scores after the last match is played, you participate in the play-offs. The season's grand finale is the pleasantly named Blood Bowl.

The amazing thing about this program is that it does so much so well. Its graphics and sound effects are first-rate, and, though it takes some getting used to, the control system is extremely easy to use. In addition, the furious battles over the ball, along with the tactical challenge of using the on-screen markers effectively, result in an exciting gaming experience for either one or two players.

When joined together, all these features make Speedball a must buy for fans of futuristic sports contests. *(Spotlight Software; distributed by Cinemaware Corp., 4165 Thousand Oaks Blvd., Westlake Village, CA 91362. C-64/$29.95.)*

—WALT LATOCHA
OAK PARK, IL

Watch out that cave crud doesn't zap your strength in Axe of Rage.

REPORT CARD

A Superb!
An exceptional program that outshines all others.

B Good.
One of the better programs available in its category. A worthy addition to your software library.

C Average.
Lives up to its billing. No major hassles or disappointments here.

D Poor.
This program has some problems. There are better on the market.

E Failure.
Many problems; should be deep-sixed!

AXE OF RAGE ..... A

Have Axe, Will Travel

What can you say about a game whose box features an extreme close-up of some Neanderthal's blood-spattered face and comes with its own press-on tattoo? If you're ready to grab the first copy you can get your hands on, be assured that Axe of Rage won't disappoint you.

You start the game by choosing one of two axe-wielding characters. Your object is to make your way through three mazes before entering the subterranean sanctum of Drax. Drax must be destroyed before he can "shrink humankind's advanced brain capacity back down to the size of a pea."

Using your trusty axe, you must dispose of several different types of bizarre creatures. In the Valley of Despair, for instance, you'll encounter Knuckle Draggers, Blade Bellies and the dreaded Lardosaurus (who has a nasty habit of abruptly ending his battles by biting off your head), while the Dungeon is home to Octospleens, Leaping Larvae and the Carnivorous Pit Lizard. If you make it all the way to Drax's place, you can look forward to a battle with the Gargantuan Phlegm Launcher.

As you chop away at each of these strange beasts, strength meters show how much you and your opponent are weakening. In addition, the little squirt ►

BAD TO THE BONE

These are the streets. And there are no rules when you do battle here.

STREETFIGHTER is strictly survival of the fittest against 8 of the baddest dudes from around the world. Watch out for flying scissor kicks, lethal Ninja weapons, and other evil tricks. Block their attacks while you counter with jabs and roundhouse kicks. Don't drop your guard cause these guys aren't just b-b-b-b-bad. They're "Bad to the Bone."

So see your favorite software retailer or call Capcom U.S.A. 408-727-1665. You don't want to keep these guys waiting!

Try a roundhouse kick against an English street tough.

Dodge the lethal Ninja weapons of Geki.

CAPCOM® USA

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of green blood from your opponent's wound lets you know when you've landed a successful blow.

The monsters are unique creatures with individual fighting styles, appearances and movements. Animation all through the game is fluid and lifelike.

Maybe the idea of slashing, hacking, slicing and dicing your way through countless blood-squirting monsters won't appeal to everyone. However, Axe of Rage is so well "executed" (pardon the pun) that most gamers will have a lot of fun with it. *(Epyx, 600 Galveston Drive, PO Box 8020, Redwood City, CA 94063. C-64/$34.95.)*

—BOB GUERRA
CHARLESTOWN, MA

TITAN ..... A–

Rollin', Rollin', Rollin' Keep that Ball A-Rollin'!

Titan is a radically different program that entices the player with its scrolling screens, billiard ball-type movement and futuristic special effects.

You control the movement (via joystick or keyboard) of a small square. Using that unit, you deflect a bouncing ball at any angle against various walls that enclose you in different levels. Once hit, the sphere never stops moving; it ricochets like a pool ball.

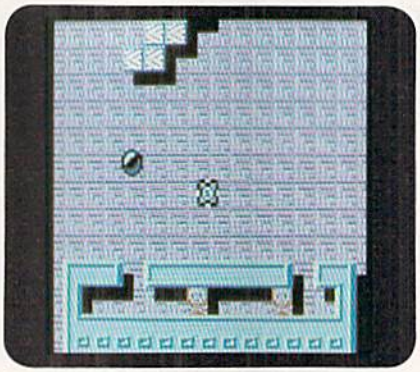
Random obstacles occupy stationary positions in each scene. When your ball hits an obstacle, the latter disappears. (But you must hit certain obstacles several times in order to destroy them.)

Bumping into certain wall sections collapses them, which lets your sphere get through. However, it's probably best to confine your on-screen ball to a more circumscribed area at first, until you've demolished one section's obstacles.

Your computer screen reveals about one-fourth of the overall display; thus, your ball often bounces out of view (unless you chase it with your control unit) and then reappears in a moment. It's hard to track and predict its behavior this way. Perhaps Titan would have been easier to play had everything been shrunk into a single view.

Your square and the sphere must avoid fixed-position skulls—hitting them risks death. In addition, you must detour around oil spills, or you'll slip up badly.

Titan's mirror-smooth movements, easy control and exceptional graphics make it superior to similar games on the market. For one thing, your bouncing sphere moves around the playing field



Warning: Your Titan sphere must avoid all contact with skulls.

like a real object—a perfect simulation of motor-movement. Also, a satisfying "click" resounds each time a collision occurs between metallic objects.

My one complaint: poorly written directions, apparently a bad translation from the original French. You must begin playing Titan to fully understand what to do.

Nevertheless, this program's a winner. Combining the best of Pinball and Tetris, Titan made me want to cheer. *(Titus Software, 20432 Corisco St., Chatsworth, CA 91311. C-64/$39.95.)*

—JOHN DIPRETE
CRANSTON, RI

TANGLED TALES ..... B+

The Trials and Tribulations Of a Would-Be Wizard

Tangled Tales is a role-playing adventure that starts you off as an apprentice to the wizard, Eldritch. You begin with no spells and no other members in your party. As you explore the city of Fairhaven and the surrounding countryside, however, you'll learn several useful spells and discover a number

The icon-based command interface is a useful feature in Tangled Tales.

of characters who are happy to team up with you.

As its name implies, Tangled Tales intertwines your quest to become a wizard with several other stories. Many of these subplots are familiar. For instance, three bears that have escaped from the circus turn up at a cottage in the countryside with a gorgeous blonde. The blonde turns out to be Goldilocks, and if you save her, she'll join your party for a short time.

Another familiar tale involves a character by the name of Sir Isaac. When you first meet him, he mentions his desire for an apple. Later, when you have a chance to bring him an apple, you accidentally drop it on his head, and, *voila*, gravity is discovered.

Tangled Tales is atypical among fantasy role-playing games, not only because of its novel uses of widely varied (though familiar) elements, but also because it is user friendly and very easy for FRP novices to play. Instead of being assigned cryptic numeric values for strength, intelligence, speed and charisma, your character's attributes are described in familiar words such as athletic, educated, brisk and tactful. These are the default settings, but you can increase your rank in any trait by decreasing your rank in another.

Another feature is the icon-based command interface. Commands such as Look, Talk, Drop, Fight, and so forth, can be entered by clicking on the appropriate icon. All commands can also be accessed by pressing the corresponding keyboard equivalents.

The screen displays a first-person view of your surroundings, an overhead map centered on your character and a message window. Although the view doesn't change for each specific location and displays all outdoor scenes in daylight, regardless of the time of day, it does provide terrific animated pictures of the people and monsters you encounter on your journey.

Even though Tangled Tales is easy to play, the game is every bit as engaging as some of the more complex role-playing games I've encountered. Many FRP games thrust you into an endless cycle of buying better weapons to kill tougher monsters to get more gold to buy better weapons.

The goal in Tangled Tales, however, is to become a wizard. To do so, you must interact with the people you meet, not amass a powerful arsenal. Sure, there are giant rats, burly guards and evil spirits to slay, weapons to acquire and gold to be won, but with Tangled Tales, these events serve to embellish a ►

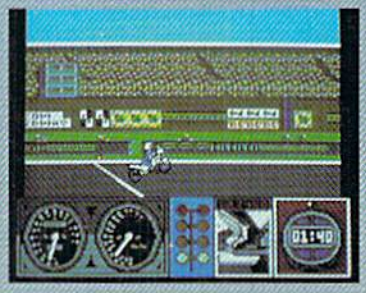
SANTA CLAUS IS COMING TO TOWN

Better watch out!

After a test ride on Pocket Rockets, the high-speed motorcycle simulation game, Santa picked up a new sleigh that will make this year's rounds faster than ever. And whether you've been naughty or nice, you could win this Suzuki 600 Katana during "Santa's Sleigh Giveaway" in January.

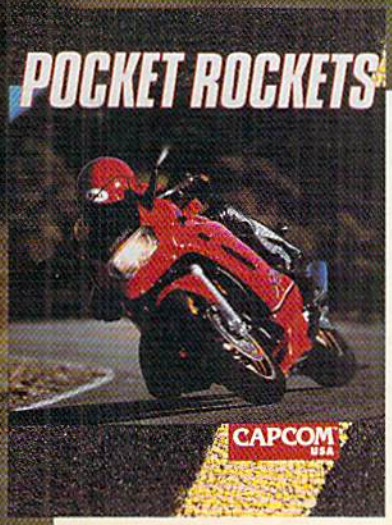
Meanwhile, experience all the thrills and spills of high-speed racing with machines that take you from zero to 60 in under four seconds. Already gaining critical acclaim, Pocket Rockets lets you choose from four of the quickest, most exotic bikes on the planet. The action's as real as the adrenaline you'll feel.

Then, enter "Santa's Sleigh Giveaway" from Capcom U.S.A. Besides the chance to win a new Suzuki motorcycle, you could get a Bell full coverage helmet, or Capcom computer game software. Look to enter in all Capcom computer game packages or visit your favorite computer game retailer for more information. Capcom's belated Christmas giveaway is just around the bend so don't miss out on your chance to win!



LEFT: Try your skill against the clock with a couple of laps around the test track. RIGHT: Drag racing demands a quick wrist and fast shifting. Just don't blow the engine!

Circle 19 on Reader Service card.



SWEEPSTAKES RULES How to Enter:

1. NO PURCHASE NECESSARY. Fill out and mail official entry found in package or you can enter by hand printing your name, address and zip code on a 3" x 5" piece of paper and mailing it to CAPCOM Santa's Sleigh Giveaway, 3303 Scott Blvd., Santa Clara, CA 95054. Enter as often as you wish. Each entry must be mailed separately by JANUARY 15, 1990. No mechanical reproductions of entry will be accepted and all mail-in entries must be received at the above address by JANUARY 31, 1990. No responsibility is assumed for lost, late, misdirected, or damaged entries.

2. Prize winners will be determined by means of a random drawing to be conducted by an independent judging organization whose decision shall be final. All prizes listed will be awarded, but there can be only one prize winner per household, group or organization. Odds of winning depend on the number of entries received. Approximate grand prize retail value is as follows: Suzuki Katana $4,495.00. Winners will be notified by mail by FEBRUARY 15, 1990 and may be required to execute affidavits and advertising release. Taxes on prize winnings are solely the responsibility of the winners.

3. Sweepstakes is open to U.S. residents except employees of CAPCOM U.S.A. and their immediate families, its subsidiaries and affiliates, its advertising and promotional agencies, and the judging firm. Prizes won by minors may be awarded to parent or legal guardian. Void where prohibited or restricted by law. All Federal, State and Local regulations apply. For a list of major prize winners send a stamped, self-addressed envelope to CAPCOM Santa's Sleigh Giveaway Winners List, 3303 Scott Blvd., Santa Clara, CA 95054 by MARCH 31, 1990.

CAPCOM® USA

much larger story. *(Origin Systems, Inc. 136-B Harvey Rd., Londonderry, NH 03053. C-64/$29.95.)*

—Bob Guerra
Charlestown, MA

✓Book ..... B+

Your Personalized Checking Account

If you're like most people, paying the bills and balancing your checkbook can be a monthly headache. If you've been hoping that your computer could ease these chores, ✓Book may be the program for you. It's a comprehensive system that not only helps you balance your checkbook, but also keeps track of your account balance and even prints on preprinted checks.

✓Book is easy to use. After entering your name, bank account name and beginning balance, you can immediately begin typing in transactions. There are 17 different transaction types to select from, including electronic transfers, monthly service charges, auto teller debits, checks and deposits.

The program then asks, "Is the Payee on File?" If yes, you simply enter the payee number. If no, you can add the payee address, account number and category type. Or, if this is a one-time payment, you might enter just the amount and check description.

Your new balance is shown at the bottom of the screen. The full checking transaction record is displayed, and you can use full-screen editing to make any changes or enter additional information. You can create a main category and subcategory, such as "M" for medical or "E" for eyeglasses. Also, you can flag transactions as tax deductible or indicate checks that have cleared.

Do you have payments automatically deducted from your account? If your car payment, life insurance premium and monthly service fee are the same amounts every month, then ✓Book can save you time entering these transactions. You can use its Scheduled Transactions option to set up these payments and the Functions menu to automatically deduct them from your checking account. (You can even edit the amount due if it differs from month to month.) The Functions menu is also where you balance your checkbook to agree with the bank statement balance.

The Query menu saves some time getting tax information ready. You can page through each transaction or request a brief one-line display of all transactions. You can choose to select transactions for certain dates, descriptions, category codes or tax-deductible flags, and then print the results of your search for your tax accountant.

The Print menu provides numerous reports of your transactions. Included are a transaction record, daily balance report, daily balance chart, payee report, scheduled transactions listing, category listing, transaction listing by category and overdraft history report.

Overall, I found ✓Book complete and thoroughly developed. There are some nice features, such as a low balance warning, password protection, on-screen help and a pop-up calculator. The manual is detailed and complete, although not easy reading. Computer Craftware deserves credit for including a C-128 version that has pull-down menus and a colorful display. ✓Book would be beneficial for your personal use or even for your small business. *(Computer Craftware, 17966 Arbolada Way, Tustin, CA 92680. C-64 and C-128/ $34.95+$2.50 for s/h.)*

—Sandra Cook Jerome
Shell Beach, CA

Double Dare ..... B

Is It on TV or on Your Computer? I DARE You To Tell the Difference!

While Double Dare will hold little appeal for some people, fans of the television show will definitely want to add it to their gaming libraries.

As leader of a two-person electronic team, you compete against another squad, which either a friend or the computer controls. Your goal is to have more dollars at the contest's end than your opponent. Correct answers to multiple-choice questions are the main route to riches; however, a wrong response lets the other player control the next question. To prevent this from happening, you can give a real stumper to your opponent by using a Dare. Unfortunately, the question can come right back on a Double Dare from your adversary.

ON THE OLD TV SHOW, WHAT WAS THE NAME OF KNIGHT RIDER'S CAR?
A-CHITTY CHITTY BANG BANG
B-K.I.T.T.
C-HERBIE
RUN
THIS QUESTION IS WORTH $10.
ENTER YOUR ANSWER OR DARE.

Will you answer the question or dare your opponents in Double Dare?

You can decline a Double Dare by accepting one of the game's Physical Challenges. The program also re-creates the show's Toss-Up Challenge and Final Round Obstacle Course, where you can earn bonus dollars.

Supported by very good graphics and sound throughout, the physical events are well thought out, although frequent play may eventually remove some of the challenge. In addition, the questions are interesting and varied, and parents will appreciate the educational element.

On the other hand, the game suffers from a few minor problems. For example, the sharing of the keyboard and a joystick by two players can be awkward at times. Also, the instructions are extremely brief, so much so that those who aren't familiar with the show may not be able to fully understand them.

Nevertheless, Double Dare is an appealing piece of software. It delivers exactly what its makers promise—an entertaining reenactment of a television series that has been enjoyed by millions. *(GameTek, 2999 NE 191st St., North Miami Beach, FL 33180. C-64/$14.95.)*

—Walt Latocha
Oak Park, IL

California Pro Golf ..... B–

Inexpensive Greens Fees On this Course!

Imagine a golf simulation retailing at $9.99 that boasts many of the features of established programs costing three times as much. Such is the lure of Mastertronic's California Pro Golf.

From two to four competitors can play either a tournament (lowest score wins) or a match (winner of most holes is victor), or an individual can go it alone in Tournament mode. Golfers can select 14 of 17 clubs available to tackle either of the two equally challenging courses.

The center of the game screen is reserved for one of three basic playing areas: the course proper, the greens and the maps of each hole. Your view of the first is from behind and above the on-screen golfer and the various fairways, sand traps, trees and water obstacles. Greens and maps are seen from overhead. ►

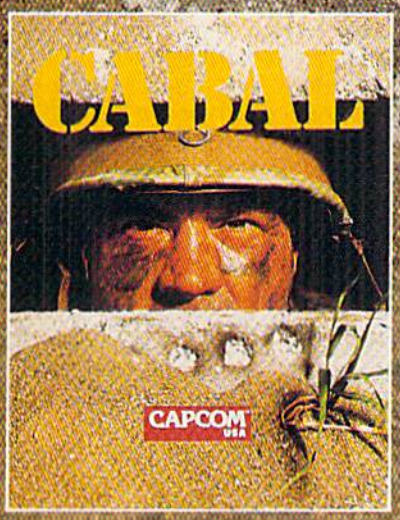
ANOTHER ONE BITES THE DUST

Eliminating terrorists.

Easier said than done. You must destroy these soldiers of fortune who strike you with machine guns, tanks, grenades and worse. Only then can you celebrate your victories.

Go beyond traditional war games and see why CABAL is #1 in the arcades. The fast action of every covert operation keeps you at the edge of survival.

See your favorite software retailer to enlist in the excitement. Or for more details, call Capcom U.S.A. at 408-727-1665 Act fast so that "another one" is one of them.



Cabal Screen Shots.

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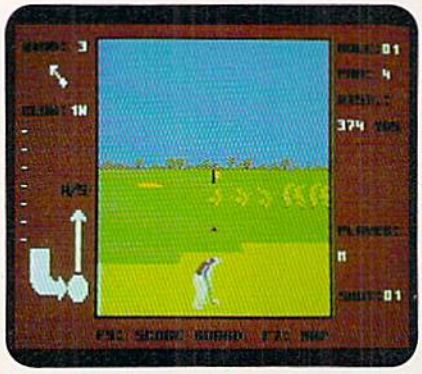

If you can't play the real game this winter, practice with California Pro Golf.

For drives and approach shots, you select the club to use, the amount of loft, whether to hit straight or to hook or slice (to counteract effects of the wind), and how much force to put behind your stroke. Much of this requires moving the joystick handle or pressing the firebutton at just the right time.

Until you become proficient at reading the greens, you'll find yourself four-putting every hole. Using the side and top elevations provided, you must accurately position the crosshair, which controls the strength and direction of your putt. Unfortunately, the program does not provide a practice putting green, so you'll have to "learn as you go."

In the course proper, moving your cursor to the side of the screen draws the adjacent areas one at a time until you have made a complete revolution. Instant replays and the ability to save your handicap to disk are also included.

CPG's graphics are adequate, although the course proper lacks the sense of depth found in more expensive programs. As a result, it's very difficult to visually gauge distances, forcing you to rely totally on the yardage information provided to the right of the main screen.

Among drawbacks are the program's lack of a course editor and a feature for printing a copy of your scorecard. In the original version, it was also impossible to call up a final tally at the end of a round. Thankfully, this oversight was corrected in the revised program. One aspect of poor quality control that remains is the presence of two consecutive identical holes in Course 1.

Another deficiency is that there are no novice, intermediate and expert settings. The documentation is also unfortunately skimpy and especially misleading in one crucial area—club distances. With any club, always assume that your ball will travel farther than the manual suggests.

CPG is nearly as good as its higher-priced competitors, and at one-third the price. Rabid electronic golfers and game players on a tight budget take note. *(Virgin Mastertronic, Inc., 18001 Cowan St., Irvine, CA 92714. C-64/$9.99.)*

—Len Poggiali
Syracuse, NY

Devon Aire in the Hidden Diamond Caper ... C+

Crack the Crystal Case
As You Avoid Animal Atrocities

What Cary Grant was to Hitchcock's *To Catch a Thief*, Devon Aire is to Epyx's Devon Aire in the Hidden Diamond Caper. As the debonair cat burglar, you've been hired by a wealthy widow to find 12 precious gems that were hidden by her peculiar late husband. Each is concealed in a different location within the 30 rooms of the family mansion. You must discover the whereabouts of the stones and return them to your employer before your strength runs out. On the surface, this might seem a simple task; however, by comparison, Grant had it easy.

Several obstacles complicate matters—the sheer number of rooms and objects you must investigate and the seemingly inaccessible locations whose entrances you must discover. In addition, danger lurks in the form of killer canaries, mutant pig-mice and poisonous plants, all of which must be avoided or neutralized.

Food, which satisfies the pig-mice, is in plentiful supply. Bird cages that contain the canaries are another story. According to an Epyx representative, there are two cages in the house. After hours of play, I have yet to find one. Fortunately, you can render all three hazards temporarily impotent if you're holding a ringing telephone.

Aiding you in your search is the ability to move furniture, to carry some items between rooms and to place objects atop one another in order to climb high enough to reach certain areas. Also, you regain some of your strength by drinking goblets of fruit juice.

You can summon many commands via joystick, although pulling, picking up and dropping objects and pausing, resuming and saving a game can only be controlled from the keyboard. You are allowed to save just one game per blank, formatted disk, so keep a number of disks handy.

Devon Aire's animation and three-dimensional graphics are of first-rate quality. From the billiard room to the boudoir, you move smoothly through screens of beautifully rendered and easily recognizable locations, replete with furniture, fireplaces, grandfather clocks and other appropriate objects.

For all its sophistication, however, this C-64 translation seems incomplete. Knowing that the 16-bit versions have many more rooms to explore and diamonds to find fuels this belief, as does the generic quality of the annoyingly brief and inadequate documentation.

As treasure hunts go, Devon Aire is a disappointment. Because diamonds appear to be hidden arbitrarily, finding them is more an act of endurance than of problem solving. Choosing objects, carrying one at a time and stacking them to reach inaccessible areas requires more patience than mental adroitness. And, without easily obtainable weaponry, warding off canaries is more of a pain than a challenge.

If the designers were looking for logical and worthy adversaries, why didn't they include greedy relatives, sneaky servants and a rival female cat burglar? Cary Grant would have settled for no less. Why should we? *(Epyx, 600 Galveston Drive, PO Box 8020, Redwood City, CA 94063. C-64/$29.95.)*

—Len Poggiali
Syracuse, NY

Last Ninja 2 ..... A

Beneath the streets of New York City, the evil Samurai Master Armkakuni awaits you. To answer his challenge, you must travel through seven devious levels.

Last Ninja 2 is a refreshingly different martial arts contest that goes well beyond the simple formula of kick-thrust-then-go-to-a-different-screen format. You must be able to defend yourself against the hordes of bad guys and use your noggin in dealing with puzzles, traps and other dilemmas.

There is an amazing depth to this program. As you travel through three-dimensional screens, you can move in front of, behind and through many of the on-screen objects while contending with a multitude of doors, passages, gates, cliffs and other obstacles.

The program's animation is highly professional, with on-screen action fluid and lifelike. Your ninja can move in any direction; however, it'll take several hours of game play before you'll be able to deftly leap and kick without losing a life (of which you only have five, although you can gain more by picking up certain objects). ►

FACE THE FIRE

Weapons of fury.

It's the next century in FORGOTTEN WORLDS, and you're the only one left who can save Mother Earth from savage aliens. Your space-age weaponry is awesome but so are your obstacles! Armed with an anti-gravity device you can fly through enemy defenses and eradicate the alien bases. But watch out! Missiles, monsters, dragons, robots and laser guns are bombarding you from every direction!

If you're ready to save Earth's defenseless men, women and children, see your favorite software retailer or call Capcom U.S.A. at 408-727-1665

There's havoc in the factory as you blast away the invaders.

The Bronze Dragon is a formidable foe. You never know when it will strike!

CAPCOM® USA

Circle 34 on Reader Service card.

The key to success here is joystick mastery and keen powers of observation and deduction. A timer and scorekeeper show your progress, while the concise gaming instructions offer several helpful hints.

All in all, Last Ninja 2 is a superb game and probably the best of its class in the martial arts genre. Sequels rarely do justice to the original, but this program shows that the biggest and brightest stars are often born from earlier ideas. *(Activision; distributed by Mediagenic, 3885 Bohannon Drive, Menlo Park, CA 94025. C-64/$34.95.)*

—JOHN RYAN

COMBAT COURSE ..... A

Hold on to your dog tags. To pump you up for danger, your drill sergeant has designed an incredibly rigorous school of hard knocks.

Your combat lessons take place on a military assault course—more fun than a chamber of horrors. This boot camp puts you through the mill—playing with live grenades, dodging a man-eating dog, blowing up crates of dynamite, using an automatic rifle and crawling through drain pipes. If you survive, you should enlist.

The program's graphically detailed, scrolling scenery realistically portrays an outdoor training course. You can run, jump, set explosives, kneel, crawl and more. Using your joystick or keyboard in Combat mode, you can crouch, kick, punch, defend and even do push-ups.

With the game's Construction Set, you can design and save your own courses. It's fun to push props around, plant grenades and stage events. You shouldn't have any problems following the instructions or manipulating the on-screen components.

If you favor diverse game elements (search and destroy, hand-to-hand combat, and so on), you'd better run for the cover of your Commodore and boot up Combat Course. *(Mindscape, Inc., 3444 Dundee Rd., Northbrook, IL 60062. C-64/$29.95.)*

—JOHN DIPRETE

THE MAGIC CANDLE ..... A–

The Magic Candle is a huge game, but quite straightforward as computer role-playing programs go. It has a bit of an Ultima flavor—there are dozens of lands to explore, all with multiple levels and dungeons.

Gathering information is a massive chore. There are over 300 conversations from which you can get clues as to what needs to be done and where things can be found.

The members of the party you form have to earn money for weapons and armor, learn magic, collect information and sharpen their fighting skills so as to be ready for the final confrontation. As their leader, you have to keep track of them to make sure they get enough rest and nourishment to perform their tasks.

When, and if, you finally put all the pieces together, you'll have to supervise all your companions in the proper procedure for entrapping Dreax (the leader of the evil armies that threaten to plunge your homeland of Deruvia into eternal darkness) back into the Magic Candle.

The Magic Candle is not simply a grab-the-treasure-and-run game. It will take all your concentration and powers of deduction—as well as a bit of luck—to successfully complete your mission. While the C-64 graphics and animation are a little primitive, the game is so engrossing that it doesn't really present a problem.

Warning: Before playing The Magic Candle, cancel all your appointments and dates for the next few weeks! *(Miles Computing, Inc.; distributed by Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. C-64/$39.95.)*

—ART LEWIS KIMBALL

THE CRACK OF DOOM C

The official computer adaptations of Tolkien's three-volume fantasy, *The Lord of the Rings*, and its companion piece, *The Hobbit*, are the creations of Addison-Wesley Publishing's software department. If The Crack of Doom, the last in the company's four-part series, is any indication of the quality of these translations, then the results are decidedly mixed.

The game is played in real time, although a pause command is available. Commands are typed in—an antiquated method in this day of point-and-click interfaces. Fortunately, allowances are made for sequential commands, certain time-saving abbreviations and some flexibility in word order. The 800-word vocabulary is adequate, as is the game-saving function.

Maintaining close ties to its literary source gives the program some credibility as an educational tool. Unfortunately, the game version features bland writing and lackluster characterizations.

Further, although the on-screen illustrations are attractive, they are inaccurate and fail to capture the tone of the original.

On the plus side, the game's documentation provides excellent background, detailed operating instructions, a map and three pages of hints. Also, the program is not copy protected.

The Crack of Doom is a moderately enjoyable way of being introduced to Tolkien's works, although it will never be confused for the real thing. *(Addison-Wesley Publishing Company, Route 128, Reading, MA 01867. C-64/$29.95.)*

—LEN POGGIALI

WAR IN MIDDLE EARTH ..... D

Tolkien's three-volume *Lord of the Rings* is an exciting, yet philosophical, adventure that occurs in a magical realm populated by endlessly fascinating characters. War in Middle Earth, Melbourne House's software adaptation, lacks the philosophy, the magic, the fascinating characters, and, most deplorably, the excitement of the original.

Hampering all your efforts with the program are a flawed control system and inaccurate documentation. Although you can move each on-screen piece individually via joystick, when you arrive at a battle line, your way may be blocked by your own men. In such circumstances—documented assurances to the contrary—there is no way to switch control from one figure to another. As a result, you're forced to look on and let the battle run its course. Other major defects include your inability to form battle lines (another documented feature missing), to retreat and to concede defeat in a hopeless clash.

In addition to spending hours moving pieces and fighting battles, you can view attractive character portraits and descriptions, all of which, however, reside on a second disk. Since loading these non-essentials into memory is time-consuming, I doubt that this disk will get much use.

With no spells to cast, interesting characters to meet, inns or taverns to visit or intermediate goals to keep you involved, War in Middle Earth offers little for adventure fans. My advice: stay in your Hobbit hole, reread the novels and save your money for a worthier product. *(Melbourne House; distributed by Mastertronic, 18001 Cowan St., Irvine, CA 92714. C-64/$39.99.)*

—LEN POGGIALI ■

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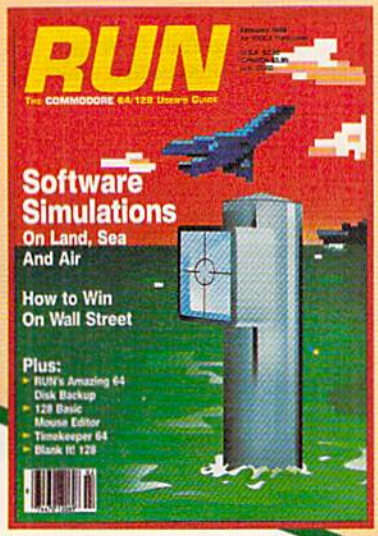

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2. **MAZAMORF***. If you liked Pac-Man, you'll be doubly challenged to avoid these voracious meanies. And all the while you'll be trying to make your way out of a maddeningly different kind of maze!

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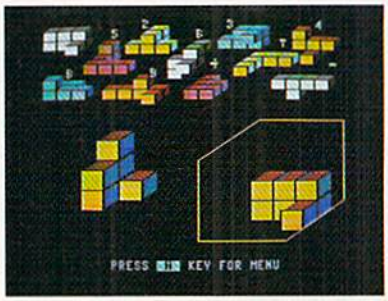


But beware, these twin teasers share only their name—and their neural nastiness!

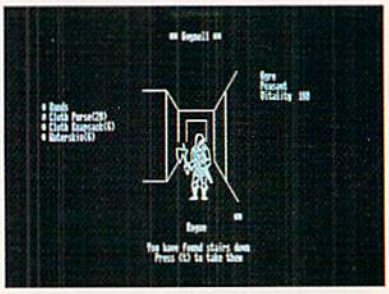
5. Meanwhile, back in the outer reaches of the universe, load up for a couple rounds of **DEATH QUADRANT**. The blast-happy lover of Asteroids in you will never be busier!

6. Remember what the good old days were like? Well, **BYE, BYE BRICK** reminds you of the by-gone thrills of Breakout, but this time in 80-column color mode.

7. Get your trigger-finger ready for **NIGHTHAWK 128**, a delightful challenge that tests your driving and your shooting skills!

8. **GWYNELL** is a detailed 3-D maze adventure that takes you through level-upon-level of dungeon-danger.

There's always an en-counter or an interesting twist just beyond the next door!



* Denotes a 40-column mode game.

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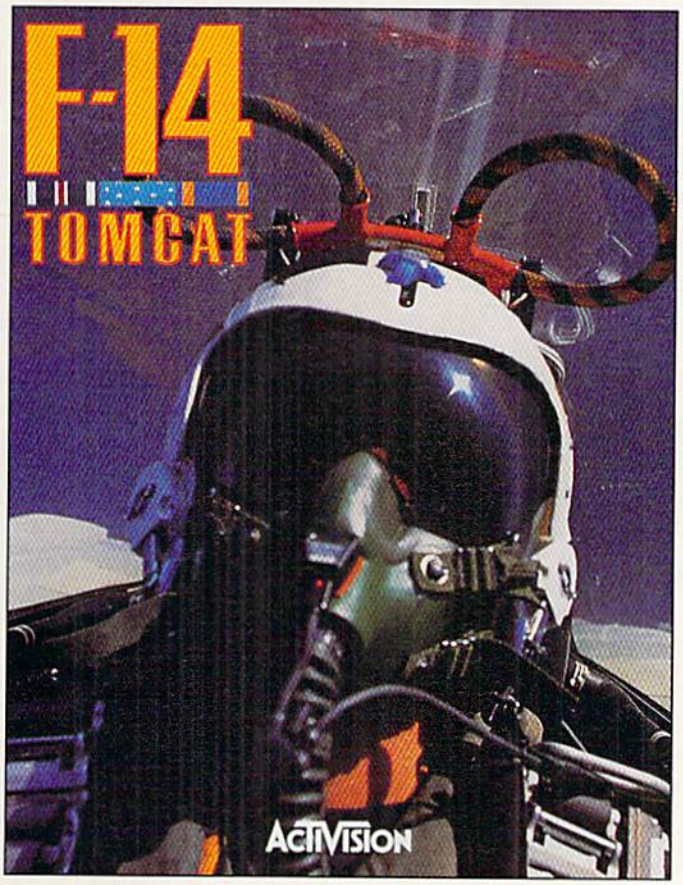
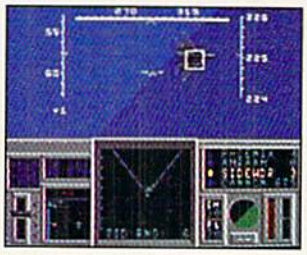
Will they call you "Tinkerbell" or "Deadeye"?





Take on the best pilots in one-on-one dogfights at the Naval Fighter Weapons School to find out who is the real top gun.

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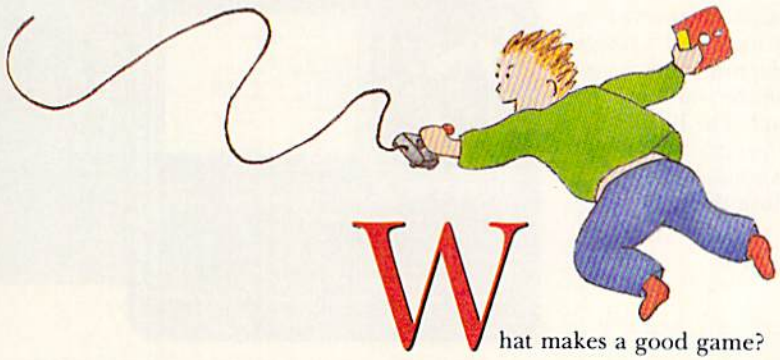
Ten Top Games

The games people play are many these days, but which ones lead the popularity pack? We asked—and here are the answers!



What makes a good game?

If you asked a dozen users for a specific example of a good game, you'd get a dozen different answers. However, you could come to a consensus that all good games should be easy to play, offer a substantial value and, most of all, be entertaining.

Those characteristics are all common to the winners of *RUN*'s Reader Choice Contest.

We all know that the primary application of computers in the home is games. That's right. Walk into a typical Commodore user's home and chances are you'll see Arkanoid, rather than Superbase, on the screen. More time is spent mapping adventure game strategies than telecommunicating. And users are more interested in perfecting their joystick-maneuvering agility than their programming skills.

But which games are the most popular among users?

To find out, *RUN* conducted its annual reader choice poll. We asked readers to select their five favorite games—no easy decision, given the hundreds available for the Commodore. To help, we limited our ballot to those games that hit the market in 1988 and early 1989.

The winners—highlighted below—represent a microcosm of the software marketplace. While adventure games dominate, just about every genre of game is there—education, sports simulations, arcade, strategy and wargaming.

The results indicate that the *RUN* voter is very discriminating. Today's computer gamer wants excitement, challenge, playability, entertainment and, most of all, fun—all for less than the price of a good pair of sneakers. He wants sound and graphics that rival the special effects of major motion pictures. Compared to the computer user of just a ►

By *RUN* EDITORS

ILLUSTRATED BY LAURA JOHNSON

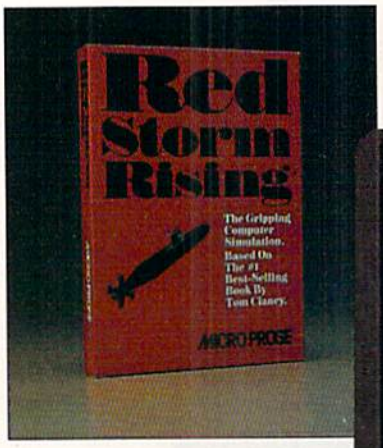
few years ago, today's gamester has grown up and has cultivated sophisticated tastes.

You can deduce the following from the results of our poll:

1. If a game is successful, consumers tend to stick with it. Sequels fared well in the voting.
2. *RUN* voters are looking to get their money's worth. In return for their investment, they want a game that offers hours and hours of play along with plenty of time to become proficient with the game.
3. Consumers have moved away from simple arcade shoot-'em-ups. Today's games are more involved, more interactive and more complex, and require a certain level of dedication and commitment from the user.

Keep in mind that this poll was not a beauty contest. All of the winning programs are deserving, quality products that cater to today's discriminating Commodore computer users.

But, enough of this. There's a danger in becoming too analytical. Let's get to the stars of the show. Introducing the top five winners, along with the five honorable mentions, of this year's contest:



RED STORM RISING

In emergency session Russia's leaders decide to take Middle Eastern oil-fields. But this would provoke an overwhelming counterattack by NATO. Therefore, Russia must strike first in Europe, neutralizing NATO with a surprise assault.
RED STORM RISING from Microprose!

When it comes to sophisticated simulations, MicroProse is the king, and their best effort to date is Red Storm Rising. This submarine warfare game, based on Tom Clancy's popular novel, offers a realistic wargaming environment, combined with a variety of scenarios and play options. Your success means world peace, while your defeat could mean the flag of the hammer and sickle flying over the U.S. Capitol. It's entertaining, it's fun, it's exhilarating. It's simply the best military simulation to be released for the C-64 since Gunship.

THE BARD'S TALE III: THIEF OF FATE

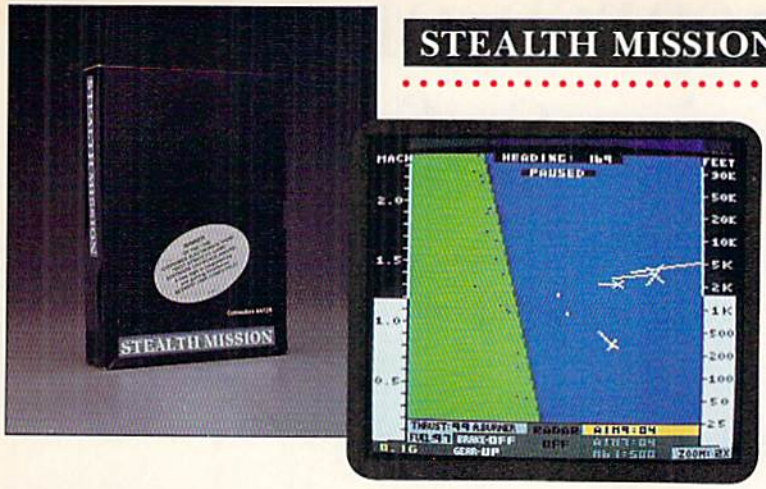
Electronic Arts brings you more monsters, magic, elves and dungeons in their popular fantasy role-playing series. Using a mix of logic and strategy, you must gather a group of adventurers to search out the Mad God Tarjan; failure will leave the world of Skara Brae in his bond. The Bard's Tale series personifies adventure programming and brings characters to life with its animated graphics. Role-players of all levels will love this one.

POOL OF RADIANCE

SSI has performed magic in adapting Dungeons and Dragons action to the computer screen. This four-disk package provides hours of adventure, with a heavy emphasis on an intricate combat system. There's enough excitement here to satisfy both D & D fans and computer gamers alike. More than just another role-playing game, it's a significant addition to the genre.

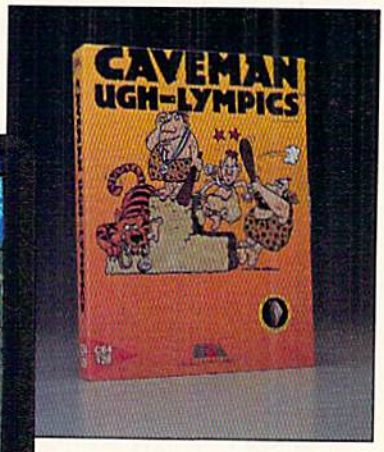
PHOTOGRAPHED BY LARRY DUNN

STEALTH MISSION



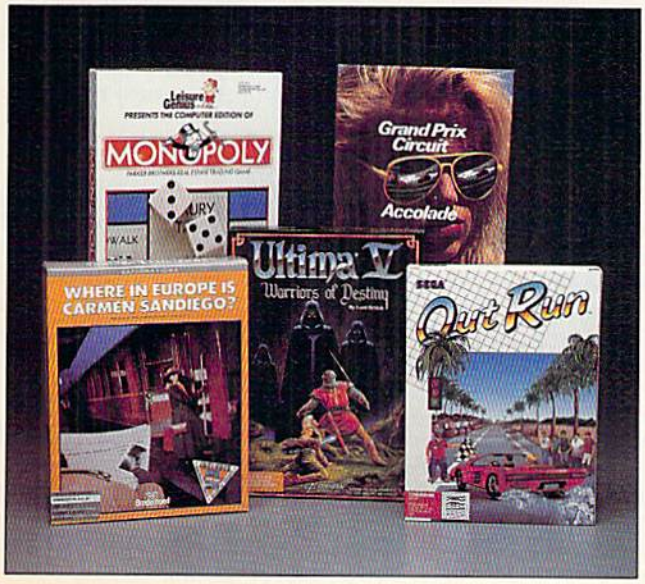
With its wide variety of options, this is the most ambitious flight simulator we've seen since Flight Simulator. You chart your own course by choosing the difficulty level, type of aircraft and combat mission. The program's easy-to-follow instructions quickly get you airborne and keep you off the ground for hours. We dip our wings to SubLogic for its programming attention to detail . . . and for supporting both 64 and 128 markets with this software title. This challenging and entertaining program clearly ranks as the top flight simulator of the year.

CAVEMAN UGH-LYMPICS



This game tickles your funny bone as it tests your joystick skills. A light-hearted look at Olympic competition in the days of the dinosaur is an entertaining idea, and its execution is even better. Great graphics, fluid animation, playability, antics of cartoon-like characters and a liberal dose of humor assures this program a place in the annals of software history. Only a Neanderthal would fail to appreciate the entertaining humor of this game. As reviewer John Ryan notes, "it contains elements rare in today's software market: good graphics, great sound and the marvelous combination of irreverence and slapstick comedy." The handwriting's on the cave: Not since dinosaur rocks has prehistoric man contributed so much to modern man's entertainment.

HONORABLE MENTIONS



GRAND PRIX CIRCUIT—Once again, Accolade's attention to detail pays off. Fast action, superb graphics and a unique racing perspective make Grand Prix Circuit, of all the car-racing games, the one that "captures the feel, excitement and competitive spirit of racing."

ULTIMA V—Welcome to the fantasy world of Lord British. This is the latest in a long-running series that just keeps getting better. All the traditional winning elements of fantasy role-playing are here—attention to detail, adventure, interaction, ease of play and more—to bring a richly detailed fantasy adventure to life on the screen.

MONOPOLY—No one should be surprised that the world's most popular board game is a software hit. As much fun as the classic . . . and, you don't have to clean up the dining room table after a game!

WHERE IN EUROPE IS CARMEN SANDIEGO?—Don't tell the kids that this is an educational game—it may spoil their fun! Broderbund has devised a successful formula in which you—armed with an atlas or almanac—must know your history and geography, including culture and economy, to solve the crime. A great and entertaining learning tool.

OUT RUN—Wave the checkered flag for this program's entertaining sound effects, superb graphics and animation. This is arcade action at its best. You'll burn out a joystick or two before you tire of this game. ■

In Search of Productivity Software

You don't have to be Indiana Jones to uncover a treasure trove of useful programs.

By ELLEN RULE

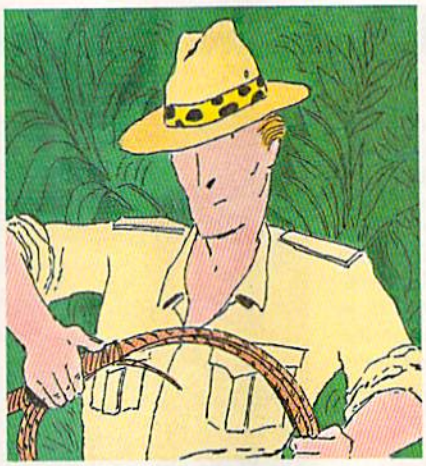
You might be amused by the sight of this intrepid *RUN* author, dressed now in khaki, adorned with pith helmet and machete in belt, ready to hack through the jungle of entertainment titles in search of productivity software. Then again, perhaps you, too, bought your C-64 or C-128 to accomplish meaningful tasks and would like to come along. We won't see everything, of course, but we will uncover a variety of word processors, databases and spreadsheets, plus desktop publishing and financial programs. There will even be some titles that are no longer in print but are well worth digging for.

So off we go. Swinging our machetes, we slash our way along a narrow path through the undergrowth, entertainment titles and flashy ads pressing in from all sides. Suddenly a huge mound of earth and stone blocks looms ahead! Could this be the legendary Pyramid of Productivity? We tear at the vegetation, then push through the weathered door. Down a dark, winding corridor an archway appears, bearing the inscription Integrated Packages. We've found it!

Integrated Packages

Passing through the door, we enter a splendid chamber that, despite the heavy growth outside, has not long been forsaken. Enshrined here is Professional Software, Inc.'s **Fleet System 2+** (C-64) and **Fleet System 4** (C-128), a word processing package that includes a spell checker, thesaurus and pop-down menus, and, as a bonus, comes with a database, Fleet Filer.

Nearby we spot **Superscript 64** and **Superscript 128**, from Precision Incorporated, menu-driven word processors with five-function calculators, plus line and column arithmetic, and, beside them, Precision's **Superbase 64** and **Superbase 128**, powerful database management systems. Broderbund's **Bank Street Writer**, **Filer**, **Mailer** and **Speller** modules for the C-64 are just visible in the light of our torches.



"What about something with more comprehensive math functions?" whispers someone in our party. Looking further, we behold Timeworks' extensive productivity line and record our discovery: **Word Writer 4** (C-64) and **Word Writer 128**, with calculator, thesaurus and integrated outline processor; **Partner 64** and **Partner 128**, cartridge-based accessories with eight desktop functions; **Swiftcalc 64** and **Swiftcalc 128**, spreadsheets with 12-digit accuracy, financial analysis features, super-graphics modules for graphs and charts, and a wonderful feature, Sideways, that prints out your data sideways, so nothing is lost off the paper; and **Data Manager 2** (C-64) and **Data Manager 128** for filing and recordkeeping.

We also spot Digital Solutions' **Pocket 2 Series** for the C-64 and C-128 and log its many components: **Pocket Writer 2**, one of the best WYSIWYG (what you see is what you get) word processors, with math column functions, foreign characters and an optional dictionary; the **Pocket Filer 2** database, with versatile sort and custom-report capabilities; and **Pocket Planner 2**, a spreadsheet with 16-digit accuracy, on-screen help, sideways printing and graphing. We note that, true to the concept of an integrated package, Filer and Planner data can be merged into Writer.

Advancing farther into the chamber, our torch light falls on the cartridge-based **VizaWrite 128** (Progressive Peripherals & Software), which, in addition to the usual WYSIWYG, mailmerge and word-wrap features, includes math functions and the capability to extend page width. Alongside it is **VizaStar 128**, an office information system that includes a database, a spreadsheet and business graphics.

Suddenly we feel a change in the air and know we're near the Graphics Environment Operating System, **GEOS**. Produced by Berkeley Softworks for both the C-64 and C-128, GEOS is the most comprehensive of all integrated packages, with **geoWrite**, **'Paint**, **'Calc**, **'Chart**, **'Publish**, **'Programmer**, the forms-oriented **geoFile**, and the accompanying **DeskPack** and **FontPack**. Nearby, we see Spinnaker's **Better Working Word Publisher**, an alternative GEOS-compatible word processor.

Word Processing and Desktop Publishing

As we move about, we notice several other chambers adjacent to Integrated Packages. The first contains word processing and desktop publishing packages. Hieroglyphics on the wall reveal the presence of Xetec's **Fontmaster II** (C-64) and **Fontmaster 128** with Speller, an extremely sophisticated word processor that offers more than 30 fonts, including Greek, Russian, Hebrew and custom fonts, and achieves near-desktop publishing quality with its column and paste-in graphics capabilities.

Next to Fontmaster is Busy Bee's **The Write Stuff 64 and 128** with Spell- ►

ILLUSTRATED BY KERRY GAVIN

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Circle 36 on Reader Service card.

Checker, a relative newcomer to the Commodore community. Available with a speech option in 64 mode, The Write Stuff is affordable, easy to use and packed with features and utilities.

Oops! Another favorite, Electronic Arts' **PaperClip III** (64 and 128) is dangling from a spider web right above our heads. Recovering our composure, we inspect the package, with its telecommunications module and 40,000-word speller, as well as the sophisticated **PaperClip Publisher** (64) a nicely polished desktop publishing package.

In a nearby cranny we discover three packages designed for creating and printing newsletters. Springboard's **Newsroom**, for the C-64, was one of the first such programs, while the GEOS-compatible **Personal Newsletter** from Softsync and Free Spirit's **News Maker 128** are more recent offerings. News Maker 128 works on a C-128D or a standard C-128 with a 64K video RAM upgrade. We record the programs beside geoPublish in our journal.

Peeking from a wooden chest are four outline processors: **Thoughtform** (from Steven Gollery) and **Thinking Cap** (from Broderbund) for the C-64, **Brainstorm 128** (Country Road Software), and Kamasoft's **Out-Think** for CP/M mode, all ready to help you organize ideas into outlines and turn outlines into finished documents. In the same box we find **Term Paper Writer** (Activision/Mediagenic) for the C-128 with 1571 drive, ►

PACKING A PUNCH

By MICHAEL CAVANAUGH

IN OUR SEARCH for productivity software, the ultimate system came to light: a C-128 or C-128D equipped with the latest peripherals. The C-128's Native mode has more built-in memory than C-64 mode, and it reads and writes faster from the 1571 disk drive. So, we took a look at the power you can achieve when you combine your C-128, productivity software and the following peripherals: the 1581 disk drive, the 1351 mouse and the 1750 and 1700 RAM expansion units (REUs).

First of all, the 1351 mouse provides fast, precise cursor movement with the C-128. While a luxury with many programs, it's a virtual necessity with certain GEOS applications such as geoPaint.

The REUs are useful with word processors, especially for dictionary storage and subsequent spelling checks, and they're a must with CP/M, an operating system designed around 64K machines that relies heavily on disk access. With CP/M, the RAM expanders become electronic rather than mechanical disk drives, transforming the tortoise into a hare.

Finally, the 1581 disk drive is fast, small and can store about 800,000 bytes of data. Think of it as a cheap 0.8-meg hard drive.

Passing on to the software, the **Pocket 2 series** from Digital Solutions, consisting of a word processor, database and spreadsheet, is one of the best examples of device support for the C-128 in Native mode. All three programs can load files into expanded memory and support the 1351 mouse for pulling down menus. In addition, you can store the word processor dictionary and database modules in expanded memory and use the mouse to move rapidly through the spreadsheet.

Fleet System 4, from Professional Software, Inc., will recognize a RAM expander, too, and configures it as a RAM drive, where you can store files, the dictionary and the thesaurus.

Electronic Arts' **PaperClip III** makes use of expanded memory in a slightly different way, storing both its dictionary and various program overlays there. The result is instant access to features such as the built-in terminal program, and a dictionary that checks spelling with such speed that it catches errors as you type them.

As a bonus, PaperClip III isn't copy protected. Most of the programs for the 128 can use the 1581 disk drive for file storage, but only a few, including PaperClip III,

Your C-128, productivity software and peripherals make for a knockout combo!

can themselves be copied onto a 3½-inch disk. Since PaperClip III is free of protection, it can be transferred with a simple file copier.

Another word processor that supports both the 1581 and the REUs is **Fontmaster 128** from Xetec. While this program can't load files into expanded memory, it can store the dictionary there. Also, since Fontmaster 128 uses a dongle for protection rather than a software method, it can easily be copied onto a 3½-inch disk.

A final entry in the 128 word processor category is Busy Bee Software's **The Write Stuff**. Version 2.0 of this program is available with a 77,000-word dictionary, which can be stored in memory if an REU is present. Alternatively, you can configure the extra memory as a RAM drive. The Write Stuff is sold without copy protection in both 3½- and 5¼-inch formats.

Sad to say, only a few spreadsheet and database programs support the REUs, the 1351 mouse or the 1581 disk drive. Two that do are the **Pocket 2 series**, which takes advantage of extra memory and the mouse, and Precision Incorporated's **Superbase 3.0**, which now supports the 1581 drive and can be ordered in either 3½- or 5¼-inch format. Superbase 3.0 does not support RAM expansion, however.

Little has been heard in the past year from **Basic 8**, the graphics-oriented programming language distributed by Free Spirit, but it does make excellent use of both the 1351 mouse and RAM expansion. It also recognizes the extra video memory that comes in the C-128D or that can be added to a standard C-128 via chip replacement. Although there are only a few programs available for Basic 8, it's almost worth purchasing just for the graphics demo files. They're sure to impress you with the untapped potential of the C-128.

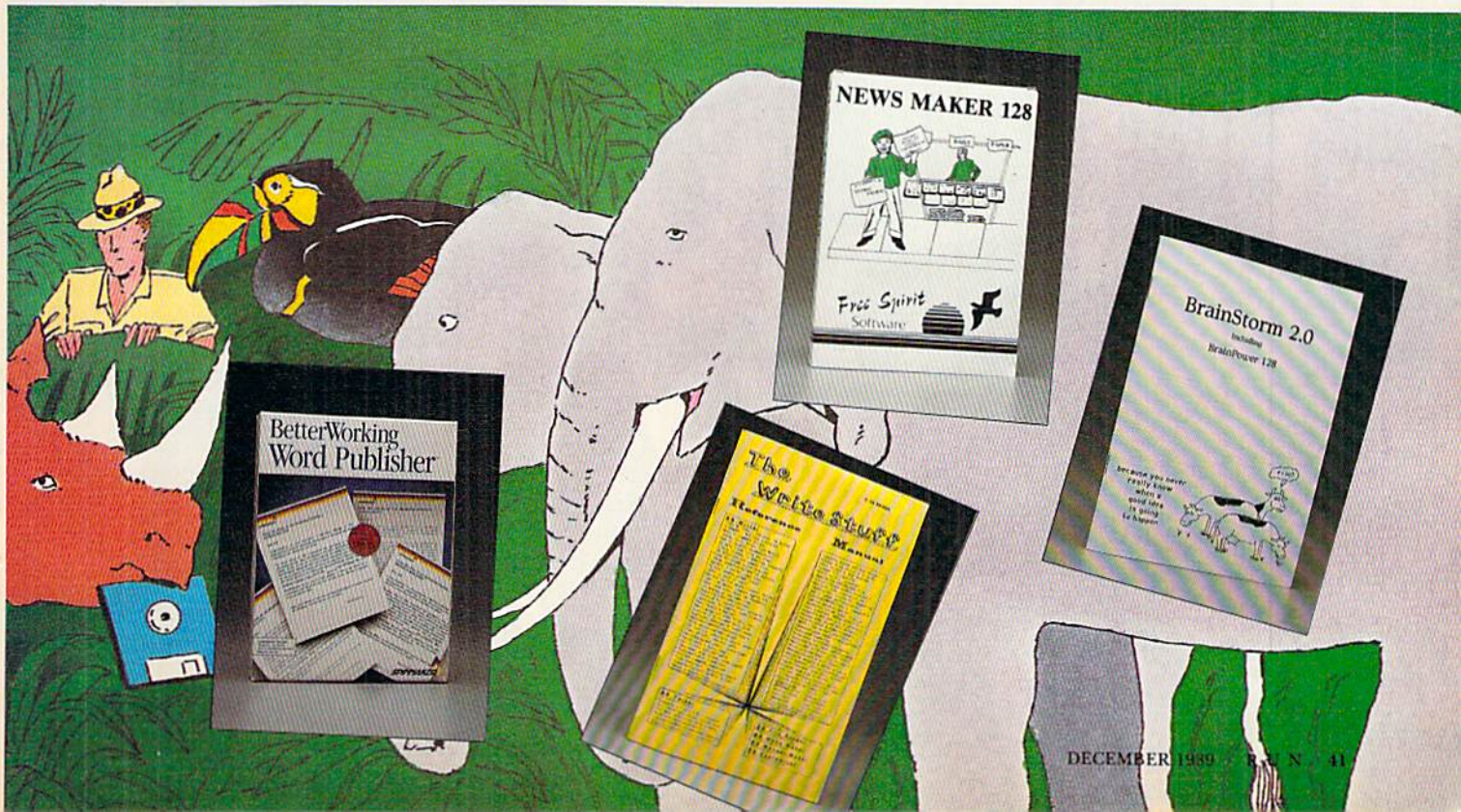
GEOS 128, with its spreadsheet, database, word processor, dictionary, terminal program, games and utilities, recognizes all three peripherals mentioned here. Also, you can run GEOS 64 programs such as geoPublish in 128 mode when using 40 columns.

While almost all GEOS programs can be copied to a 3½-inch disk, the boot (system) disk cannot. Heavy-duty copy protection means that GEOS must always be loaded from either a 1541 or 1571. Version 2.0 of GEOS 128 can utilize two physical drives as well as a RAM drive, if an REU is present.

The CP/M 3.0 operating system that's built into the C-128 can take advantage of the hardware extras, as well. It recognizes RAM expansion and automatically sets it up as drive M, and the latest release also supports the 1581 disk drive. Using the 1581 for storage greatly reduces the time needed for disk drive access, while an REU almost eliminates it. Although overshadowed in recent years by MS-DOS, CP/M is worth investigating.

These aren't all the C-128 programs that make use of the 1581 disk drive, the 1351 mouse and the 1750 and 1700 RAM expanders; they're the ones I own and have used. For information about others, check "The Tale of the RAM and the Mouse" in the November 1987 issue of *RUN* and "Dear Santa. . ." in the December 1988 issue. Instructions for ordering copies of *RUN*'s back issues appear on the last page of this magazine. R

Michael Cavanaugh, a field supervisor for the Pennsylvania Bureau of Standard Weights and Measures, enjoys photography, canoeing and bicycling when not absorbed in using his extensive Commodore system.



which takes you step by step from index cards to a completed term paper.

A nearby fissure holds Progressive Peripherals' **MicroLawyer** (64), which provides over 100 legal form templates that are compatible with most word processors, and **WillWriter** from Nolo Press, which guides preparation of a valid will.

Separate Databases And Spreadsheets

We saw most of the popular databases and spreadsheets in the Integrated Packages room, but there are others. Peeking into another chamber, we find an old standby, **The Consultant**, a database for the C-64 and C-128 from Electronic Arts (also found under the original Batteries Included label). Here also is **XPer-64** from Abacus. "More than just a database," this knowledge-based package uses your data to guide you through complex decision making.

In the spreadsheet nook we unearth a copy of the powerful **Microsoft Multiplan** for the C-64. Nearby are two Abacus programs: the menu-driven **PowerPlan 64**, with help screens and graphics, and **Chartpak** (64 and 128), which creates screen or printer displays of pie and bar charts from data entered directly or imported from spreadsheets.

We re-emerge into the central corridor, determined to find other areas to explore. Before long, scattered gold coins lead us past a pool of circling loan sharks to an entryway marked Financial Packages.

Financial Packages

Here we find **Personal Accountant** from Softsync and Timeworks' **Sylvia Porter's Personal Financial Planner** (with checkwriting) for the C-64 and C-128, as well as **J. K. Lasser's Money Manager** (Simon & Schuster), Electronic Arts' **Financial Cookbook** and Scarborough's **Net Worth** for the C-64. They are all available to help you manage your money, produce reports and plan your financial future. For simplified small-business bookkeeping, **Dome Accounting by Computer** for the 64 (Great American Software) automates the familiar Dome bookkeeping method.

Also for the C-64, the B.E.S.T. **Accounting Series** and the Timeworks **Business Management Systems** offer professional-quality, business-management modules (accounts payable and receivable, general ledger, inventory management) that can be used as stand-alone programs or as components of integrated packages. **CMS General Accounting System** provides basic accounting features, plus job costing and payroll, for the C-64 and C-128, with an optional inventory module for the 128.

KFS Accountant, which provides simplified small-business accounting for the C-128/1571 combination, includes standard accounting modules, as well as add-ons for inventory control and service invoicing. Paragon's **Cash-In Cash-Out** package for the C-128 includes sales, disbursements, payroll, reports, graphics and financial toolbox modules. And, if your accounting skills are a little rusty, **Pro Tutor Accounting** for the C-128 (Professional Software) coaches the basics.

Aboriginal drawings of bulls and bears decorate the walls over Timeworks' **Sylvia Porter's Investment Manager 128** and Abacus's **Personal Portfolio Manager** (64 and 128), which offer the home user a thorough investment management system. For more advanced charting and analysis of technical indicators, **Security Analyst 128** (Free Spirit) and Abacus's **Technical Analysis System** (64 and 128) include automatic updating via modem to keep close tabs on your portfolio.

Returning on schedule to the door, we notice income tax preparation software for the C-64: Timeworks' **Swiftax**, **Tax Master** from Master Software, **Taxaid** from Taxaid Software, **Tax Command Professional** from Practical Programs, Inc., and Double Eagle Software's **Tax Advantage**.

Telecommunications

Once again in the main passage, we brush away dusty clouds of cobwebs and peer into the shadows beyond at an inscription, Telecommunications. Our torches cast their light on Progressive Peripherals' menu-driven **Bobsterm**

Pro 64 and **Bobsterm Pro 128**, with many features for accessing local and commercial bulletin boards through a Commodore- or Hayes-compatible modem. We note that **Prototerm 128** (Free Spirit) doesn't have as many extras, but is simple to set up and use. For the would-be SYSOP, **Protolinc BBS** (Free Spirit) for the C-128 is a fast, flexible, multimessage-base BBS that's packed with features and easy to set up.

RUN Reviews

If you want to know more about any of these packages, they've all been described in past issues of *RUN*. Comprehensive articles, covering a number of packages, have included "What's Write for You?" (word processors, August '87), "Database Decision" (October '87), "Take Stock of Investment Software" (February '88), "Desktop Publishing with the C-64" (March '88), "Graphics Galore" (July '88) and "Many Happy Returns" (tax software, March '89). Many packages have also been reviewed individually in Software Gallery. Check out our annual indexes to articles and reviews to find the ones you're interested in. All annual indexes have appeared in the January issue of the following year except the 1987 index, which appeared in February of 1988. Write or call for the back issues you need; the last page of this magazine tells how.

Retail Software Outlets

The packages mentioned here can be purchased through the manufacturer, a designated distributor or mail order outlets. Mail order firms that carry Commodore software include Briwall, PO Box 129, Kutztown, PA 19530, 800-638-5757; Montgomery Grant, PO Box 58, Brooklyn, NY 11230, 800-759-6565; Software Discounters of America, PO Box 111327, Dept. RN, Blawnox, PA 15238, 800-225-7638 (in state, 800-223-7784); Tenex Computer Express, PO Box 6578, South Bend, IN 46660, 800-PROMPT-1; Software Support International, 2700 NE Andresen Rd., Vancouver, WA 98661, 800-356-1179; and Lyco Computer, PO Box 5088, Jersey Shore, PA 17740, 800-233-8760. ■

Ellen Rule keeps busy not only as a RUN *author, but as a psychiatric R.N., an active user's group member and operator of a home-based business, Home Computer Resource.*

Table 1. Manufacturers' addresses.

Abacus Software
5370 52nd St. SE
Grand Rapids, MI 49508

Activision; distributed by Mediagenic
See address below

Berkeley Softworks
2150 Shattuck Ave.
Berkeley, CA 94704

B.E.S.T.
PO Box 852
McMinnville, OR 97128

Broderbund Software
17 Paul Drive
San Rafael, CA 94903

Busy Bee Software
PO Box 2959
Lompoc, CA 93438

CMS Software Systems, Inc.
2204 Camp David
Mesquite, TX 75149

Country Road Software
70284 C.R. 143
Ligonier, IN 46767

Digital Solutions, Inc.
PO Box 345, Station A
Willowdale, Ontario
Canada M2N 5S9

Double Eagle Software, Inc.
2210 Wilshire Blvd.,
Suite 875
Santa Monica, CA 90403

Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404

Free Spirit Software
PO Box 128
Kutztown, PA 19530

Steven J. Gollery
45828 Emerson St.
Hemet, CA 92344

Great American Software
PO Box 910
Amherst, NH 03031

Kamasoft, Inc.
PO Box 5549
Aloha, OR 97007

KFS Software, Inc.
1301 Seminole Blvd.
Largo, FL 33540

Master Software
6 Hillery Court
Randallstown, MD 21133

Mediagenic
3885 Bohannon Drive
Menlo Park, CA 94025

Mindscape, Inc.
3444 Dundee Rd.
Northbrook, IL 60062

Nolo Press
950 Parker St.
Berkeley, CA 94710

Paragon Software
600 Rugh St.
Greensburg, PA 15601

Practical Programs, Inc.
PO Box 93104
Milwaukee, WI 53203

Precision Incorporated
8404 Sterling St., Suite A
Irving, TX 75063

Professional Software, Inc.
51 Fremont St.
Needham, MA 02194

Progressive Peripherals & Software
464 Kalamath St.
Denver, CO 80204

Scarborough Systems; distributed by Mindscape
Address above

Simon & Schuster Software
Gulf + Western Building
One Gulf + Western Plaza
New York, NY 10023

Softsync, Inc.
162 Madison Ave.
New York, NY 10016

Spinnaker Software
One Kendall Square
Cambridge, MA 02139

Springboard Software
7808 Creekbridge Circle
Minneapolis, MN 55435

Taxaid Software
606 Second Ave.
Two Harbors, MN 55616

Timeworks
444 Lake Cook Rd.
Deerfield, IL 60015

Xetec
2804 Arnold Rd.
Salina, KS 67401

Editor's note: If an address for software mentioned in the text is not listed in the table, the manufacturer has probably gone out of business or has stopped production on the product. This doesn't mean the program cannot be found: check stores, used merchandise ads, user's groups, software discount houses and mail order companies.

Get a Load of This!

Now 1571 and 1581 drive owners can increase C-64-mode loading speed tenfold.

By MICHAEL MILLER

The 1571 and 1581 disk drives brought increased speed and storage capacity to Commodore computing—but only when using a C-128 in 128 mode. With a C-64 (or C-128 in 64 mode), the drives default to their usual long loading times. That is, unless you use Directory Speed Loader (DSL), which loads program files up to ten times faster than normal. With DSL at work, a 130-block file that normally takes 90 seconds to load will be in memory in less than ten seconds.

DSL itself loads in only a few seconds, then automatically displays a directory of the program files on the same disk. To load one of the files, just place the cursor over its filename and press the return key. DSL checks to see if your disk drive is a 1571 or 1581 and, if so, starts loading at high speed. If you're not using a 1571 or 1581, it will load at the normal speed.

When DSL is used with a 1571, a PRINT#15,"U0>M1" command in the program automatically switches the drive to 1571 mode. When used with either a 1571 or 1581, DSL can load files of up to 250 blocks (considerably more than the usual 202-block maximum), it allows load addresses of $0400 and up, it maintains the screen display during a load, and it even checks for disk errors!

Note that, if the file you select to load loads any others in turn, the others will enter memory at normal speed. Also, DSL works great with memory snapshot-type programs.

How It Works

DSL uses a combination of Basic and machine language. The C-64 machine code is poked into the cassette buffer, and the 1571/1581 machine code is loaded into the drive via a user file, using the special 1571/1581 Utility Loader command.

DSL does not use Burst-mode serial communication, because Burst mode isn't possible on the standard C-64. However, the serial routines between the C-64 and 1571/1581 using DSL are as fast as Burst mode.

The actual speed increase using DSL with a 1571 depends on the sector interleaving that was used when the file was saved. The interleaving determines how close together sectors are written, and with the 1571 it's normally in the range 6–10. With an interleave of 10, DSL will load a file about five times faster than normal; with an interleave of 4 (the fastest that DSL can use with the 1571), the file will load ten to 12 times faster than normal. The 1581 drive has a full track buffer and uses a sector interleave of 1, making the speed increase with DSL about tenfold.

How To Use It

DSL is best installed as the first program on a newly formatted disk. Type in both DSL (Listing 1) and Make USR File (Listing 2 or Listing 3, depending on which drive you have), and save them to disk. Then run Make USR File to create a user file named either 1571 or 1581, depending on your drive. The user file will become the second file on your disk. Finally, save to the disk any files you want to be able to load at high speed. But don't save more than 20, because the DSL directory routine might scroll the excess filenames off the screen.

To use DSL, type LOAD ":*,8: and return, then RUN and return. The directory of program files will appear on the screen, and DSL will await your desire. R

Michael Miller presides over S.O.G.W.A.P. Software and is the author of Big Blue Reader, which was voted best utility in RUN's *Reader Choice Awards Contest last year.*

Running Instructions: **Type in Listing 1 and either Listing 2 or Listing 3, depending on whether you have a 1571 or 1581 drive, and save them to disk. Then, to create a fast-load disk, save Listing 1 to a freshly formatted disk. Then load and run either Listing 1 or Listing 2, as appropriate, to create a user file, which must be the second file on the fast-load disk. Finally, save to the disk any files you may want to have fast-loaded, with a maximum of 20 per disk.**

Listing 1. Directory Speed Loader menu program. (Available on ReRUN disk. See card at page 48.)

```
10 PRINT "{SHFT CLR}{CRSR DN}{2
   SPACEs}DIRECTORY SPEED LOAD
   (C) 1989 RUN":U=PEEK(186):I
   F U<8 THEN U=8        :REM*118
20 PRINT "{CRSR DN}{2 SPACEs}MO
   VE CURSOR OVER NAME - PRESS
   RETURN{CRSR DN}":OPEN1,U,96,
   "$:*=P"               :REM*92
30 GET#1,X$,X$,X$,Y$:PRINTASC(X
   $+CHR$(Ø))+ASC(Y$+CHR$(Ø))*2
   56;                   :REM*Ø
40 FOR I=1 TO 7:GET#1,A$,B$,C$,
   D$:PRINT A$;B$;C$;D$;:NEXT:P
   RINT:IF ST=Ø THEN 3Ø:REM*21Ø
50 CLOSE 1:Y=PEEK(214):OPEN15,U
   ,15,"UØ>M1"           :REM*222
60 FOR I=82Ø TO 981:READ A:POKE
   I,A:NEXT              :REM*11Ø
70 SYS 42336:AD=518:IF PEEK(AD)
   <>34 THEN 7Ø          :REM*14
80 AD=AD+1:IF PEEK(AD)<>34 THEN
```

RUN it right: **C-64 or C-128 in 64 mode; 1571 or 1581 disk drive**

```
   N$=N$+CHR$(PEEK(AD)):GOTO 8
   Ø                        :REM*1Ø9
9Ø POKE 214,Y:PRINT#15,"M-R";CH
   R$(198);CHR$(229);CHR$(1)
                            :REM*1Ø9
1ØØ GET#15,X$:IF X$=CHR$(55) OR
    X$=CHR$(255) THEN 12Ø
                            :REM*131
11Ø PRINT "{CRSR DN}LOAD"CHR$(3
   4)N$CHR$(34)","U",1{3 CRSR
   UPs}":POKE 198,1:POKE 631,1
   31:END                   :REM*16Ø
12Ø PRINT "{CRSR DN}LOADING...
   ";N$                     :REM*4Ø
13Ø OPEN2,U,2,"#2":PRINT#15,"&1
   5?1":PRINT#15,"UØ"+CHR$(255
   )+N$;:SYS 9ØØ            :REM*2
1ØØØ DATA 16Ø,Ø,169,234,44,169,
   96,141,1Ø9,3,44,Ø,221,16,2
   51,56,173,18             :REM*7Ø
1Ø1Ø DATA 2Ø8,233,5Ø,144,4,41,7
   ,24Ø,245,169,7,141,Ø,221,7
   2,1Ø4,173,Ø              :REM*88
1Ø2Ø DATA 221,74,74,77,Ø,221,74
   ,74,77,Ø,221,74,74,77,Ø,22
   1,73,249                 :REM*179
1Ø3Ø DATA 142,Ø,221,234,23Ø,1,1
   45,174,198,1,2ØØ,198,144,2
   Ø8,2Ø2,24,152,1Ø1        :REM*89
1Ø4Ø DATA 174,133,174,144,2,23Ø
   ,175,96,162,15,32,2Ø1,255,
   169,85,32,168,255        :REM*2Ø3
1Ø5Ø DATA 169,52,32,168,255,32,
   2Ø4,255,12Ø,162,23,142,Ø,2
   21,44,Ø,221,48           :REM*249
1Ø6Ø DATA 251,32,57,3,168,32,57
   ,3,133,174,32,57,3,133,175
   ,136,136,152             :REM*171
1Ø7Ø DATA 24Ø,14,2Ø1,255,24Ø,1Ø
   ,133,144,32,52,3,32,57,3,2
   Ø8,242,166,174           :REM*11Ø
1Ø8Ø DATA 164,175,134,45,132,46
   ,32,51,165,169,Ø,32,113,16
   8,88,76,174,167          :REM*1Ø3
```

Listing 2. Make USR File program for the 1571 drive. (Available on ReRUN disk. See card at page 48.)

```
1Ø PRINT CHR$(147):PRINT "{5 SP
   ACEs}COPYRIGHT 1989 RUN MAGA
   ZINE"                    :REM*1Ø7
2Ø PRINT:PRINT "MAKE 1571 DIREC
   TORY SPEED LOAD USR FILE
                            :REM*63
3Ø PRINT:PRINT "{6 SPACEs}WRITT
   EN BY MICHAEL MILLER":PRINT:
   PRINT                    :REM*115
4Ø DV=8:INPUT "CREATE USR FILE
   ON DRIVE NUMBER";DV :REM*113
5Ø PRINT:PRINT "INSERT DISK INT
   O DRIVE #";DV:PRINT:PRINT,"-
   PRESS ANY KEY-"          :REM*253
6Ø GET X$:IF X$="" THEN 6Ø
                            :REM*195
7Ø PRINT CHR$(147);"WRITING 157
   1 USR FILE...":PRINT:REM*233
8Ø A$="":FOR I=1 TO 196:READ A:
   CS=CS+A:A$=A$+CHR$(A):NEXT
                            :REM*2Ø9
9Ø IF CS<>16689 THEN PRINT "ERR
   OR IN DATA STATEMENTS":STOP
                            :REM*113
1ØØ OPEN 15,DV,15:OPEN 8,DV,8,"
   1571,U,W":PRINT#8,A$;:INPUT
   #15,E,EM$:CLOSE 8        :REM*176
11Ø PRINT E;EM$:PRINT "DONE!":C
   LOSE 15:END              :REM*168
2ØØ DATA Ø,5,192,76,176,5,169,2
   ,141,Ø,24,174,111,2,165,126
   ,2Ø8,8                   :REM*2Ø3
21Ø DATA 12Ø,24Ø,78,234,197,6,2
   4Ø,3,16Ø,128,44,16Ø,136,88,
   133,6,134,7              :REM*231
22Ø DATA 14Ø,2,2,132,Ø,32,94,13
   4,12Ø,224,2,176,5Ø,16Ø,254,
   173,Ø,3                  :REM*99
23Ø DATA 2Ø8,4,172,1,3,136,132,
   31,152,32,12Ø,5,16Ø,2,185,Ø
   ,3,32                    :REM*193
24Ø DATA 12Ø,5,2ØØ,198,31,2Ø8,2
   45,169,2,141,Ø,24,173,Ø,24,
   48,12,174                :REM*2Ø2
25Ø DATA 1,3,173,Ø,3,2Ø8,181,24
   Ø,2,169,255,32,12Ø,5,76,192
   ,218,Ø                   :REM*36
26Ø DATA 8,2,1Ø,4,12,6,14,1,9,3
   ,11,5,13,7,15,162,Ø,142
                            :REM*4
27Ø DATA Ø,24,17Ø,74,74,74,74,7
   2,138,41,15,17Ø,189,1Ø4,5,1
   7Ø,169,4                 :REM*148
28Ø DATA 44,Ø,24,2Ø8,251,142,Ø,
   24,138,1Ø,41,15,72,1Ø4,141,
   Ø,24,1Ø4                 :REM*6Ø
29Ø DATA 17Ø,189,1Ø4,5,234,141,
   Ø,24,1Ø,41,15,72,1Ø4,141,Ø,
   24,96,32                 :REM*1Ø5
3ØØ DATA 14,2Ø8,162,2,134,13Ø,1
   34,131,142,1,2,76,132,2Ø3,Ø
   ,57                      :REM*171
```

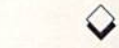
Listing 3. Make USR File program for the 1581 drive. (Available on ReRUN disk. See card at page 48.)

```
1Ø PRINT CHR$(147):PRINT "{5 SP
   ACEs}COPYRIGHT 1989 RUN MAGA
   ZINE"                    :REM*1Ø7
2Ø PRINT:PRINT "MAKE 1581 DIREC
   TORY SPEED LOAD USR FILE"
                            :REM*85
3Ø PRINT:PRINT "{7 SPACEs}WRITT
   EN BY MICHAEL MILLER":PRINT:
   PRINT                    :REM*85
4Ø DV=9:INPUT "CREATE USR FILE
   ON DRIVE NUMBER";DV :REM*117
5Ø PRINT:PRINT "INSERT DISK INT
   O DRIVE #";DV:PRINT:PRINT ,"
   -PRESS ANY KEY-"         :REM*253
6Ø GET X$:IF X$="" THEN 6Ø
                            :REM*195
7Ø PRINT CHR$(147);"WRITING 158
   1 USR FILE...":PRINT:REM*253
8Ø A$="":FOR I=1 TO 172:READ A:
   CS=CS+A:A$=A$+CHR$(A):NEXT
                            :REM*131
9Ø IF CS<>14933 THEN PRINT "ERR
   OR IN DATA STATEMENTS":STOP
                            :REM*21Ø
1ØØ OPEN 15,DV,15:OPEN 8,DV,8,"
   1581,U,W":PRINT#8,A$;:INPUT
   #15,E,EM$:CLOSE 8        :REM*154
11Ø PRINT E;EM$:PRINT "DONE!":C
   LOSE 15:END              :REM*168
2ØØ DATA Ø,5,168,96,234,234,234
   ,234,234,12Ø,169,2,141,1,64
   ,234,165,76              :REM*14
21Ø DATA 174,139,2,133,11,134,1
   2,162,Ø,169,128,32,84,255,1
   65,2,2Ø1,2               :REM*35
22Ø DATA 176,5Ø,16Ø,254,173,Ø,3
   ,2Ø8,4,172,1,3,136,132,16,1
   52,32,112                :REM*175
23Ø DATA 5,16Ø,2,185,Ø,3,32,112
   ,5,2ØØ,198,16,2Ø8,245,169,2
   ,141,1                   :REM*197
24Ø DATA 64,173,1,64,48,15,174,
   1,3,173,Ø,3,2Ø8,191,24Ø,2,1
   69,255                   :REM*191
25Ø DATA 32,112,5,88,96,Ø,Ø,Ø,Ø
   ,Ø,8,2,1Ø,4,12,6,14,1
                            :REM*199
26Ø DATA 9,3,11,5,13,7,15,162,Ø
   ,142,1,64,17Ø,74,74,74,74,7
   2                        :REM*16Ø
27Ø DATA 138,41,15,17Ø,189,96,5
   ,17Ø,169,4,44,1,64,2Ø8,251,
   142,1,64                 :REM*79
28Ø DATA 138,1Ø,41,15,72,1Ø4,14
   1,1,64,1Ø4,17Ø,189,96,5,234
   ,141,1,64                :REM*191
29Ø DATA 1Ø,41,15,72,1Ø4,141,1,
   64,96,199                :REM*229
```

■

Graphmaker

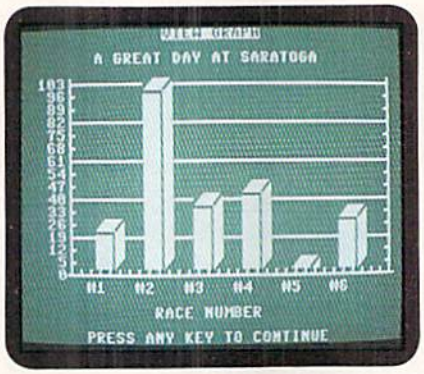
Make your data come alive with this 3-D bar-graph program.



By ROBIN FRANZEL

You can use Graphmaker 64/128 in either 40- or 80-Column mode to create attractive and informative bar graphs. If your printer outputs Commodore graphics characters, your graphs will appear in "3-D"; if you use a daisywheel printer, or have trouble getting your printer to obey commands, your graphs will be made of standard printer characters.

Data for the bar graphs can be entered manually or through complex analysis of sequential database files. You can even edit the data that defines your graph, and graphs can be saved to and loaded from disk.



Graphmaker permits novel uses.

Getting Started

Type in Listing 1, using *RUN*'s Checksum program to ensure accuracy, save it to disk and run it.

The bottom of the title screen indicates whether you're using a C-64 or a C-128 and whether you're in 40- or 80-Column mode—a handy feature for C-128 users who often switch between 64 and 128 modes. After the title screen, the main menu, shown in Figure 1, appears. When you're just beginning to use Graphmaker, you can press return for the default choice, Create Graph; 7 for Printer Setup; or 8 to End. The other selections aren't available until after you've created a graph, so let's get started by pressing the return key.

Figure 1. The main menu.

```
1. Create Graph
2. View Graph
3. Edit Graph
4. Save Graph
5. Load Graph
6. Print Graph
7. Printer Setup
8. End Program

Enter Selection (1–8) ? 1
```

Creating a Graph

Refer to Figure 2 and Figure 3 for clarification as we proceed. Figure 2 shows the initial screen for creating a graph; it requests information from you. You may find it helpful to go through the exercise of re-creating the sample graph in Figure 3.

At the **title** prompt in the Figure 2 screen, you can input both lower- and uppercase letters, and the title will appear that way in printouts. However, the letters will all be uppercase when your graph is displayed on the screen.

The **legend** is a line at the bottom of your graph that can be used for explanation, such as indicating your units of measurement. Again, both lower- and uppercase may be used.

The **number of ranges** tells Graphmaker how many bars to display in a particular graph. There are 12 bars in Figure 3.

The next prompt asks where Graphmaker will get the maximum values for each range—from keyboard input or from a disk file. If you intend to type them in, enter K; if the program should look for them in a database file on disk, enter D. For now, press K and return.

Next, you must enter a **label** for each range. These labels will run along below the x-axis of the graph, truncated by the program, if necessary, to prevent overlapping. In general, the fewer bars in a graph, the more space that's available for labels. In a 40-column graph with six bars or an 80-column graph with 12 bars (see Printing below), the labels can be up to four characters long.

Finally, you'll be prompted for the maximum value in each range. For the graph in Figure 3, 12 numbers from 10000000 to 150000000 (no commas) must be entered. To make the graph look neater, I edited the numbers (see Edit Graph below) to run from 10 to ►

Figure 2. Initial screen for creating a graph.

```
Create Graph

Press ← for Menu

Enter Title:
Enter Legend:
Number of Ranges (1–12):

Keyboard or Disk Input? (k/d)

Label for Range 1:
.
.
.
```

RUN it right: **C-64 or C-128, in 40- or 80-Column mode; printer optional**

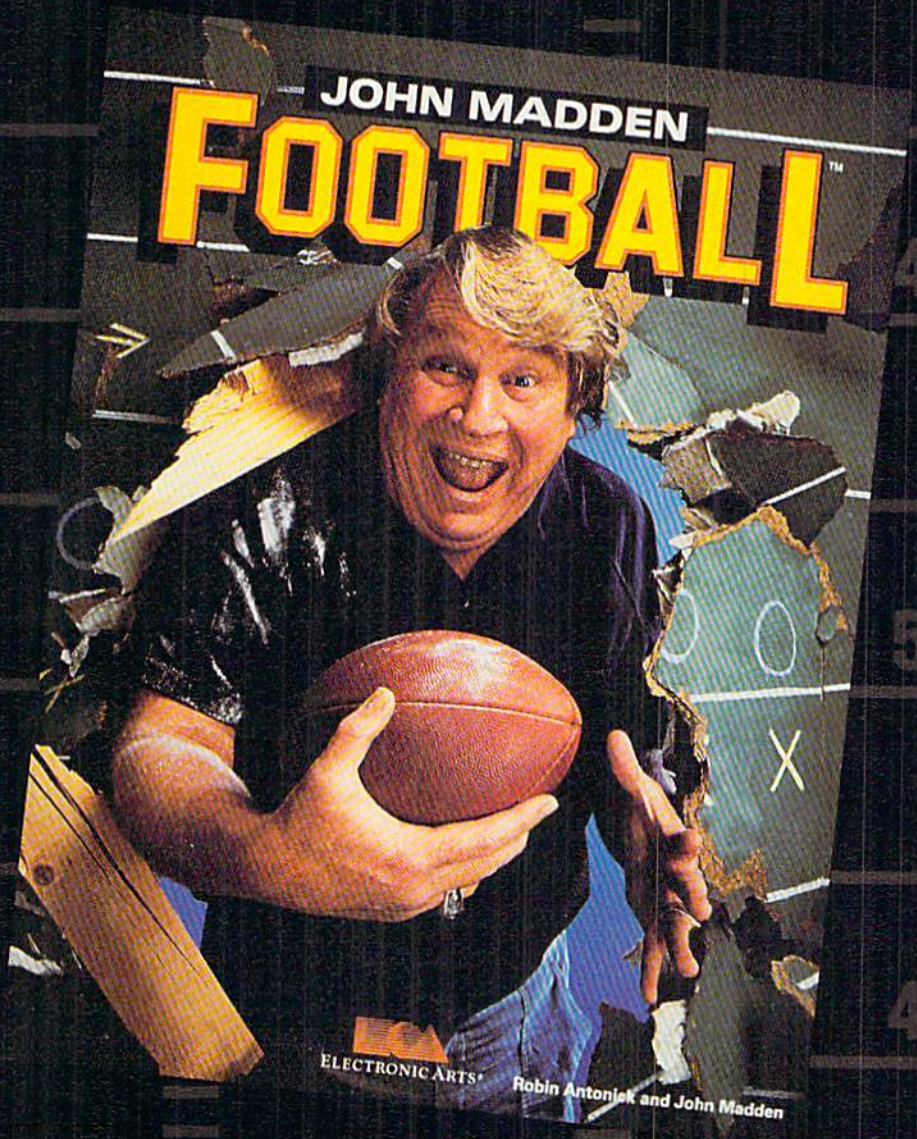
The Complete Football Game For Real Football Fans

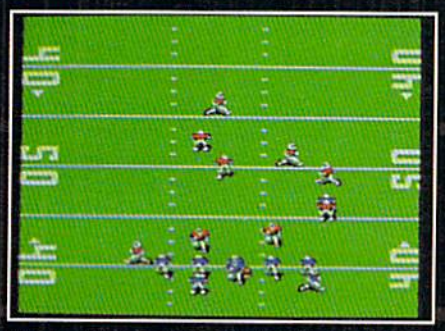
Co-designed by John Madden, including over 160 plays from the actual playbooks of John Madden. If that's not enough, you can design your own plays for both offense and defense.

Take to the field, launching the long bomb or bursting across the line of scrimmage as full field graphics bring the excitement of live football onto your screen.

The Quick Set-up Game will have you playing in minutes. The Standard Game gives you everything from audibles and injuries to on-side kicks and astroturf.

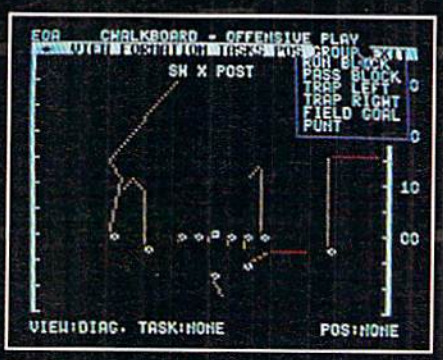
Look for the NFL Players Association Players Disk™ for John Madden Football. Crash through the line of scrimmage as your favorite superstar. Challenge a friend...your favorite football team against his.





Cut back against the grain. The yardage you gain is affected by everything from ball carrier skills and defensive formations to turf and weather conditions.

Choose your line-up with the Madden Report, a head to head comparison of important match-ups; everything from speed and fatigue to passing accuracy.



Design your own plays, then put on the pads to see how they work against different defenses.

ELECTRONIC ARTS®

How to Order

Visit your retailer or phone with VISA/MC: USA or Canada, 800 245-4525, Mon-Fri, 8am-5pm Pacific Time. IBM and Apple versions - $49.95. C64 version - $39.95. IBM, Apple, and C64 are registered trademarks of International Business Machines, Corp., Apple Computer Corp., and Commodore Electronics Limited respectively. NFLPA is a registered trademark of the National Football League Players Association.

Circle 142 on Reader Service card.

150, then indicated the conversion in the legend.

After you have answered all of the prompts, the main menu will reappear, with a new default choice of 2, for View Graph. Before I describe that option, however, let's see what happens if you press D at the Keyboard/Disk Input prompt.

Analyzing a Disk File

To learn how to analyze a database file, consider a database that contains statistical data on a fictitious company. The record for each employee includes the fields shown in Figure 4.

Many Commodore database and spreadsheet programs produce sequential data files that can be read into a word processor. Before you attempt to use a data file with Graphmaker, load it into a word processor so you can look at it.

Figure 5 shows a printout of the beginning of a data file on our fictitious company created by RapidData Software's DataOrg database. That program places fields holding the filename, the number of records, the number of fields per record and the name of each data field at the beginning of the file, before the actual data. Graphmaker must be told to skip this housekeeping information. Figure 6 shows a DataOrg printout of the same database, including all the records.

Now that you know the layout of our database file, let's produce the following bar graphs:

1. Number of employees in each work category.
2. Distribution of employees by age group.
3. Salaries paid in each work category.

Graphmaker offers three types of database analysis in the Disk menu in Figure 7. With option 1, you can count occurrences based on comparisons of alpha/numeric data (we'll use this for our first graph). Option 2 lets you specify high and low values for your ranges using numeric analysis (the second graph). With option 3, you can sum a numeric field based on an alphabetic comparison of a second field (the third graph).

Analysis Option 1

To re-create a graph showing the number of employees in each work category, enter 6 for the number of ranges, since there are six types of work. Then press D at the Keyboard or Disk Input prompt and 1 for Tally Field.

The number to enter next, for **fields to skip**, depends on your file organization. To analyze the entire contents of your data file, you'd enter 0. For our example, enter 7 to skip the seven housekeeping fields of the file (see Figure 5 again). Any time you've progressed this far and realize you don't know how many fields to skip, you can enter ← to return to the main menu.

To analyze the number of employees in each work category, enter 3 for **field number of data**, since Type of Work is the third field in each record.

The number of **fields per record** also depends on your file organization. ►

Figure 3. Sales by year.

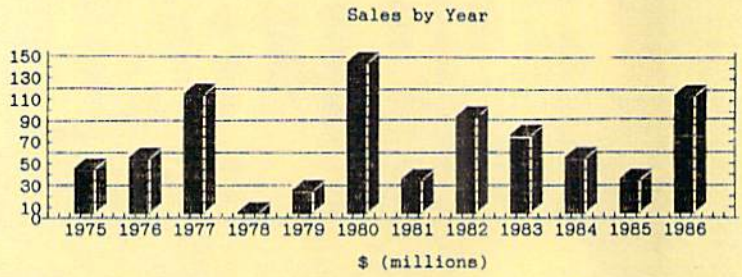


Figure 4. Fields in sample employee record.

Field 1: Employee number
Field 2: Employee age
Field 3: Codes by type of work
- 1 Manual Labor
- 2 Secretarial
- 3 Supervisory
- 4 Analysts
- 5 Managerial
- 6 Executive

Field 4: Salary of Employee

Figure 5. Printout of beginning of sample data file.

```
SAMPLE.DBF
 42
 4
EMPL NUM
EMPL AGE
TYPE WORK
SALARY
1
52
6
125000
2
45
6
100000
3
38
5
65000
```

Figure 6. Printout of a portion of a sample database.

NO.	AGE	TYPE	SALARY
1	52	6	125000
2	45	6	100000
3	38	5	65000
4	42	5	63500
5	34	3	32750
6	36	3	33500
7	28	3	30250
8	38	3	38200
9	42	5	55000
10	53	5	63500
11	47	2	23500
12	42	2	21500
13	22	2	18200
14	18	2	16500
15	18	2	16500

Figure 7. The Disk Menu.

Create Graph

1. User-Defined Ranges
   Tally Field (Alpha/Numeric)

2. User-Defined Ranges
   Tally Field (Numeric)

3. File-Defined Ranges
   Sum Field

4. Return to Main Menu

Enter Selection (1–4)

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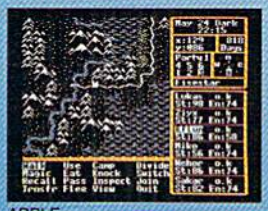

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Since each record in our example has four fields, enter 4 at this prompt.

The number of ranges was specified earlier, but now you must indicate what each of those ranges represents by entering its Type of Work code: 1–6 (see Figure 4 again). You can use the graph editor later to change these codes to more meaningful labels.

Now Graphmaker will read your data file and create the graph; then it will display the main menu so you can view, edit, save or print the graph.

Analysis Option 2

Next, we'll do the analysis of employees by age. Enter 4 for the number of ranges and D at the Keyboard or Disk Input prompt, then 2, for Numeric Tally, when the Disk menu (Figure 7) appears. Again, you'll be asked for the number of fields to skip, field number of data and number of fields per record. This time, the field number of data will be 2, for the Age field.

When the program prompts for the **low/high value for the range**, enter the minimum and maximum age in each group. If you enter a high value that's smaller than the corresponding low value, Graphmaker will alert you and let you re-enter the values. The labels for the ranges will be generated automatically, based on your input.

Analysis Option 3

The final type of analysis we'll do sums up one field based on the contents of another. It produces a graph that shows how much money was paid in salaries to each type of worker. Enter 6 for the number of ranges, since there are six types of work for which salaries will be totaled. Then select 3 at the Disk menu (Figure 7) and enter the number of fields to skip.

With this analysis, the prompt for **field number of data** refers to the field you want to sum. Enter 4 for our example, since salary is the fourth field. **Field number for ranges** is again 3, Type of Work.

If you wanted to use an alphabetic field for selection of records to be included in summing a numeric field, you'd respond with A to the Alpha or Numeric prompt. For our example, we're using the numerically coded Type of Work field, so enter N.

Finally, as before, enter the number of fields per record and the ranges to be searched.

Viewing Your Graph

Once you've created your graph, the default at the main menu becomes 2, for View Graph. Press return, and, if your computer is in 40-Column mode, the first six bars of the graph will appear. The bars to the right are still there, but there isn't any room to display them. As I mentioned before, they'll appear in the printout (see Printing, below). In 80-Column mode, your entire graph will fit on the screen.

To make changes to your graph, press any key to access the main menu, and then select 3, Edit Graph.

Editing Your Graph

In Edit mode, you can retype the title, legend, range labels and even the range values. When you're done, the main menu will reappear, offering you the option to proceed to another part of the program or to edit some more by pressing 3 again.

Saving Your Graph

Once you've created your graph and edited it as desired, you'll probably want to save it to disk. Select 4 from the main menu, then enter a filename that's no more than 16 characters long. If you enter one that's too long, Graphmaker will automatically truncate it. Any time the program encounters a problem with the disk drive, it will display an error message on the screen and return you to the main menu to try again.

Loading Your Graph

To load a previously saved graph into Graphmaker, select 5 at the main menu and enter the filename. Here again, the program will report any disk errors.

Printing Your Graph

Printing a graph is as easy as pressing 6 at the main menu. If the printout doesn't look right, see the Printer Setup section below to correct it.

The printout of a graph that contains six or fewer bars will be one-half page wide; a graph that contains more than six bars will extend across a full page. You can expand a graph with six or fewer bars to make more room for range labels by adding enough "invisible" bars (no label and a range value of 0) to bring the total to seven.

Printer Setup

Graphmaker makes use of Commodore graphics to print out the same three-dimensional graph you see on the screen. However, you can also produce a printout with normal daisywheel characters. Just select 7 at the main menu and respond "no" at the CBM Dot Matrix Printer prompt.

You'll be prompted to enter the secondary addresses that Graphmaker should use to open your text and graphics printer files. Normally, you'd select 7 for the text secondary address and 0 for graphics, but with a daisywheel printer, you must select 7 for both. If these secondary addresses don't work with your printer, consult your printer or interface manual for other possibilities.

Finally, Graphmaker will ask for the number of printer control codes to send to the printer when the printer file is opened. If you don't want to send any codes, overwrite the default with 0. The default settings will tell an Epson-compatible printer to print approximately 10 lines per inch (a $^{7}/_{72}$-inch linefeed), so the lines barely touch. If these control characters aren't correct for you, refer to your printer manual to determine how to adjust the linefeeds.

End Program

Selecting 8 at the main menu terminates execution of Graphmaker. If you have a graph in memory, the program will ask for verification that you want to exit—in case you forgot to save the graph or need to print it out. Then type N to return to the main menu, or Y to leave the program.

Even if you type Y, it's not too late to save or print your graph. Just enter RUN 740, and the main menu will return, with your last graph still in memory. Ⓡ

Robin Franzel, who currently manages a software development group, has written many articles and programs for RUN.

Running Instructions: **Type in Listing 1, save it to disk and run it.**

Listing 1. Graphmaker program. (Available on ReRUN disk. See card at page 48.)

```
10 DATA 5,27,64,27,65,7 :REM*22
20 REM **** STORE PRINTER CODES
    ****                :REM*179
30 IFPEEK(215)<>0ANDPEEK(215)<>
   128THENPOKE55,0:POKE56,158:C
   LR:GOTO50           :REM*180
40 POKE57,0:POKE58,158:CLR
                       :REM*32
50 READZ:POKE40579,Z:FORI=1TOZ:
   READK:POKE40579+I,K:NEXT
                       :REM*226
60 POKE40576,0:POKE40577,7:POKE
   40578,0             :REM*207
70 REM "*********************
   *****"               :REM*82
80 REM "****{2 SPACEs}{SHFT G}{
```

Continued on p. 84.

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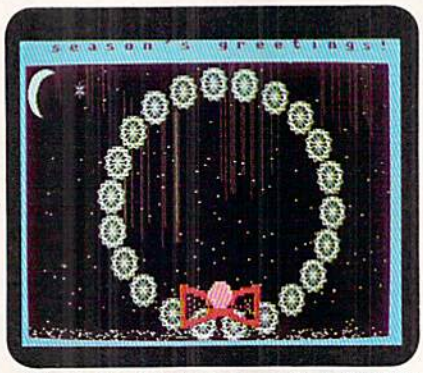
Season's Greetings

Here's a creative visual display, accompanied by a familiar musical theme, that will put you in the holiday spirit.

By MALCOLM GARDNER

Circle around your C-128 and enjoy the magical holiday scene created by Season's Greetings, a program for the C-128 in 40-Column mode. Much of Santa's know-how about C-128 sound and graphics went into this program. The scene features a wreath of moving multicolored lights that's highlighted by a big red bow. The wreath hangs in a window that looks out on a night sky filled with stars and a crescent moon. Snow sifts down, piling higher and higher on the outside window sill for about an hour. The background music is not a run-of-the-mill holiday ditty, but the Ode to Joy, from Beethoven's ninth symphony, played by various "instruments" at different tempos.



Type in Listing 1, using *RUN*'s Checksum program to keep any stray snowflakes from shorting it out, and then save it to disk. If you're in 80-Column mode when you run Season's Greetings, you'll be prompted to switch your monitor to 40 columns, then to return to 80 columns when you end the display (just switch the monitor button again). From 40-Column mode, you'll be prompted to wait 20 seconds while the program loads some of Santa's graphics data.

When you're ready for bed or to depart to an alternative program, just push the run-stop key while the light is moving around the upper portion of the wreath. With warm season's greetings to everyone! R

Malcolm Gardner is an environmental designer and producer of serigraphic works who enjoys the holiday season and computer graphics.

Running Instructions: **Type in and save Listing 1; thereafter, just load and run the program.**

Listing 1. Season's Greetings program. (Available on ReRUN disk. See card at page 48.)

```
1 GOTO1Ø                    :REM*125
1Ø TRAP33Ø:PRINT"{SHFT CLR}{2 C
   RSR DNs}ONE MOMENT . . .":SL
   EEP2:FAST:GOSUB 35Ø:IF RGR(Ø
   )>=5THENPRINT"{CRSR DN}PLEAS
   E SWITCH MONITOR TO {CTRL O}
   4Ø COLUMN"CHR$(143)" MODE."
                            :REM*194
2Ø COLORØ,1:COLOR4,15:COLOR1,Ø2
   :GRAPHIC1,1              :REM*61
3Ø X=11:I=9Ø:FL=Ø:G=1:CT=-1:W=7
   :V=193:XM=18:YM=35       :REM*48
4Ø DOUNTILX=3:FOR A=15TO165STEP
   3Ø:CIRCLE1,11,1Ø,X,,,,A,I:NE
   XT:X=X-4:I=I+9Ø:LOOP     :REM*65
5Ø SSHAPE SPIR$,Ø,Ø,23,21
                            :REM*128
6Ø GSHAPE SPIR$,Ø,Ø,4       :REM*175
7Ø SPRSAV SPIR$,1:MOVSPR1,Ø#Ø
                            :REM*135
8Ø GOSUB 27Ø                :REM*164
9Ø COLOR1,16:FORM=1TOØSTEP-1:CI
   RCLEM,XM,YM,16:PAINT1,15,24:
   XM=XM+8:YM=YM+3:NEXT:PAINTØ,
   28,38,Ø:FORM=6ØTO36ØSTEP6Ø:C
   OLOR1,15: CIRCLE1,48,33,5,,,
   ,M,18Ø:NEXT              :REM*247
1ØØ CT=CT+1:FORA=9ØTO216STEPØ6
                            :REM*4
11Ø Y=SIN(A)*8Ø:X=COS(A)*96:COL
   OR1,14                   :REM*173
12Ø IF FL=ØTHENGSHAPE SPIR$,(X+
   16Ø),(Y+1ØØ),2:ELSE GOSUB22
   Ø:MOVSPR1,(X+183),(Y+15Ø):G
   OSUB 3ØØ: ON G GOSUB 23Ø,24
   Ø,25Ø,26Ø                :REM*174
13Ø NEXT                    :REM*5
14Ø IF G=ØTHENG=1           :REM*193
15Ø IF FL=Ø THEN BEGIN      :REM*244
16Ø MOVSPR2,169,188:MOVSPR3,157
   ,2ØØ:MOVSPR4,179,2ØØ
                            :REM*132
17Ø MOVSPR5,5Ø,1Ø:MOVSPR6,11Ø,1
   ØØ:MOVSPR7,19Ø,7Ø:MOVSPR8,2
   8Ø,3Ø                    :REM*46
18Ø SPRITE2,1,11,1,1,1,Ø:SPRITE
   3,1,3,Ø,1,1:SPRITE4,1,3,Ø,1
   ,1:SPRITE5,1,2,1,1,Ø:SPRITE
   6,1,2,1,1,Ø:SPRITE7,1,2,1,1
   ,Ø:SPRITE8,1,2,1,1,Ø
                            :REM*18Ø
19Ø MOVSPR5,18Ø#1:MOVSPR6,18Ø#1
   :MOVSPR7,18Ø#1:MOVSPR8,18Ø#
   1                        :REM*149
2ØØ SLOW:BEND               :REM*5Ø
21Ø FL=1:GOTO1ØØ            :REM*1ØØ
22Ø C=(RND(1)*15+2):SPRITE1,1,C
   ,Ø,Ø,Ø,Ø:RETURN          :REM*142
23Ø TEMPO (INT(RND(1)*14+12)):P
   LAY"V1 XØ TØ U2 O4 HE QF QG
    QG QF QE QD QC QC QD QE QE
    QD HD":G=G+1:FORP=1TO8Ø:NE
   XT:RETURN                :REM*48
24Ø PLAY"U3 T6 O4 HE QF QG QG Q
   F QE QD QC QC QD QE QD QC H
   C M":G=G+1:RETURN        :REM*1Ø1
25Ø FILTER6ØØ,Ø,Ø,1,14:PLAY"U9
   X1 TØ O3 QD QD QE QC QD IE
   IF QE QC QD IE IF QE QD QC
   D HG M":G=G+1:RETURN:REM*58
26Ø FILTER1ØØØ,1,Ø,Ø,15:PLAY"U7
    X1 T7 O2 HE QF QG QG QF QE ►
```

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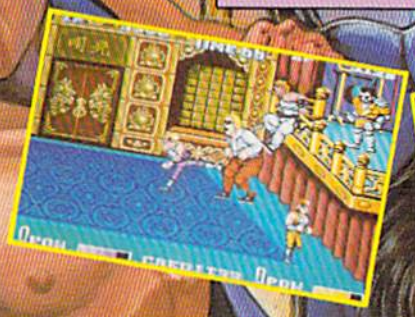

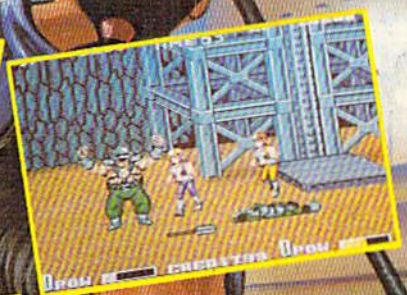

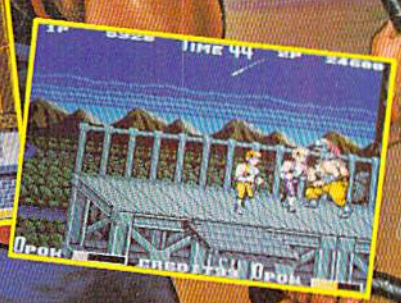

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SEASON'S GREETINGS

```
    QD QC QC QD QE .HD QC WC":
    G=Ø:RETURN          :REM*116
27Ø COLOR1,2:FOR R=1TO2ØØ:X=RND
    (1)*3Ø4+16:Y=RND(1)*193:DRA
    W1,X,Y:NEXT:FOR R=1TO14Ø:X=
    RND(1)*32Ø:Y=RND(1)*7+193:D
    RAW1,X,Y:NEXT       :REM*73
28Ø COLOR1,15:CHAR1,Ø,Ø,CHR$(14
    )+"{3 SPACEs}S E A S O N '
    S{3 SPACEs}G R E E T I N G
    S !{2 SPACEs}"+CHR$(142),1
                        :REM*68
29Ø CHAR1,Ø,1,"{4Ø SPACEs}",1:C
    OLOR1,6:RETURN      :REM*161
3ØØ IF CT>1Ø THEN W=23:V=177:EL
    SE IFCT>5THENW=15:V=185
                        :REM*117
31Ø IFCT>2ØTHENW=39:V=161:ELSE
    IF CT>15THEN W=31:V=169
                        :REM*16Ø
32Ø COLOR1,2:FOR R =1TO4:X=RND(
    1)*32Ø:Y=RND(1)*W+V:DRAW1,X
    ,Y:NEXT:RETURN      :REM*234
33Ø FORS=1TO8 :SPRITES,Ø:NEXT:I
    F RGR(Ø)>=5THEN GRAPHIC5,1:
    ELSE GRAPHICØ,1     :REM*242
34Ø PRINT"HAPPY HOLIDAYS TO ALL
     GOOD {CTRL 9}RUN{CTRL Ø} R
    EADERS,":PRINTTAB(1Ø)"{CRSR
     DN}E V E R Y{3 SPACEs}O N
    E !":END            :REM*17Ø
35Ø FOR MO=3648TO4Ø95:READ Z:PO
    KE MO,Z:NEXT:RETURN:REM*2Ø4
36Ø DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,
    Ø,Ø,Ø,Ø,Ø            :REM*223
37Ø DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,
    Ø,Ø,Ø,Ø,Ø            :REM*169
38Ø DATA Ø,Ø,124,Ø,Ø,254,Ø,1,25
    5,Ø,3,255,128,3,255,128
                        :REM*21Ø
39Ø DATA 3,255,128,1,255,Ø,Ø,25
    4,Ø,Ø,124,Ø,Ø,Ø,Ø,Ø  :REM*74
4ØØ DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,
    Ø,Ø,Ø,Ø,Ø            :REM*135
41Ø DATA Ø,Ø,24Ø,Ø,Ø,254,Ø,Ø,25
    5,224,Ø,227,255,Ø,232,127
                        :REM*235
42Ø DATA 24Ø,226,3,255,232,128,
    31,226,42,16Ø,232,128,31,22
    6,3,255             :REM*75
43Ø DATA 232,63,24Ø,227,255,Ø,2
    55,24Ø,Ø,255,Ø,Ø,24Ø,Ø,Ø,Ø
                        :REM*146
44Ø DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,
    Ø,Ø,Ø,Ø,Ø            :REM*11Ø
45Ø DATA Ø,Ø,Ø,Ø,15,Ø,1,255,Ø,1
    5,255,Ø,127,135,3,252
                        :REM*6Ø
46Ø DATA 7,255,224,87,255,Ø,7,Ø
    ,85,87,255,Ø,7,255,24Ø,87
                        :REM*69
47Ø DATA 1,254,7,Ø,63,199,Ø,7,2
    55,Ø,Ø,255,Ø,Ø,15,Ø:REM*219
48Ø DATA 64,Ø,Ø,Ø,Ø,Ø,64,Ø,Ø,Ø,
    2,Ø,Ø,Ø,1,Ø          :REM*7
49Ø DATA Ø,Ø,Ø,64,Ø,Ø,Ø,Ø,128,Ø
    ,Ø,Ø,Ø,Ø,Ø,Ø         :REM*69
5ØØ DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,32,Ø,Ø,Ø
    ,Ø,Ø,Ø,2,Ø           :REM*14Ø
51Ø DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,132,Ø,
    Ø,Ø,Ø,Ø,4,Ø          :REM*2Ø6
52Ø DATA 128,Ø,Ø,Ø,Ø,2,Ø,32,Ø,Ø
    ,Ø,Ø,Ø,Ø,Ø,16        :REM*62
53Ø DATA Ø,64,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø
    ,128,Ø,Ø,Ø,Ø         :REM*247
54Ø DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,1,Ø,Ø,Ø,
    Ø,2,Ø,Ø,5            :REM*53
55Ø DATA Ø,Ø,2,Ø,Ø,Ø,Ø,Ø,128,Ø,
    Ø,Ø,Ø,Ø,Ø,Ø          :REM*215
56Ø DATA Ø,32,1,Ø,16,Ø,Ø,Ø,Ø,Ø,
    Ø,Ø,64,Ø,Ø,Ø         :REM*182
57Ø DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,1,Ø,
    Ø,Ø,Ø,Ø,Ø            :REM*196
58Ø DATA Ø,Ø,Ø,Ø,5,Ø,Ø,2,Ø,16,Ø
    ,Ø,Ø,Ø,Ø,Ø           :REM*255
59Ø DATA Ø,2,Ø,16,Ø,Ø,Ø,Ø,Ø,Ø,Ø
    ,Ø,Ø,Ø,Ø,Ø           :REM*14Ø
6ØØ DATA Ø,Ø,Ø,64,Ø,16,Ø,Ø,8,4,
    Ø,Ø,Ø,Ø,Ø,Ø          :REM*251
61Ø DATA Ø,Ø,Ø,4,Ø,Ø,Ø,Ø,128,Ø,
    4,Ø,Ø,Ø,Ø,Ø           :REM*6
62Ø DATA Ø,Ø,Ø,Ø,Ø,1,Ø,Ø,128,12
    8,Ø,Ø,Ø,Ø,Ø,Ø        :REM*94
63Ø DATA Ø,Ø,Ø,Ø,Ø,1,Ø,Ø,Ø,Ø,Ø,
    Ø,Ø,Ø,Ø,Ø            :REM*184
```

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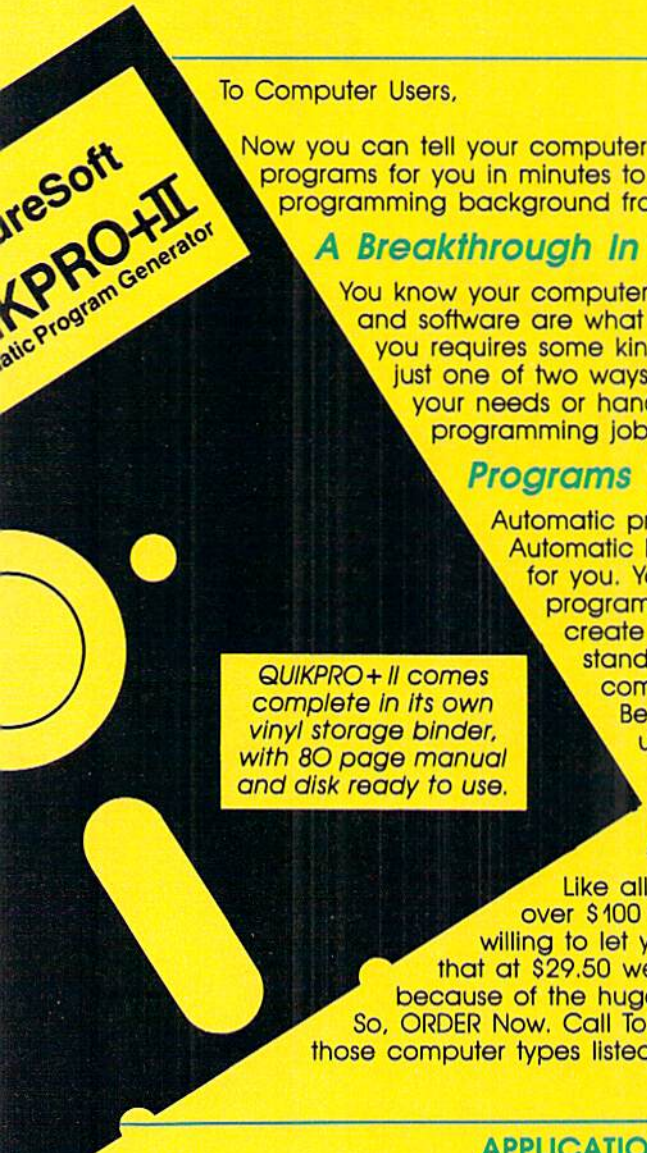

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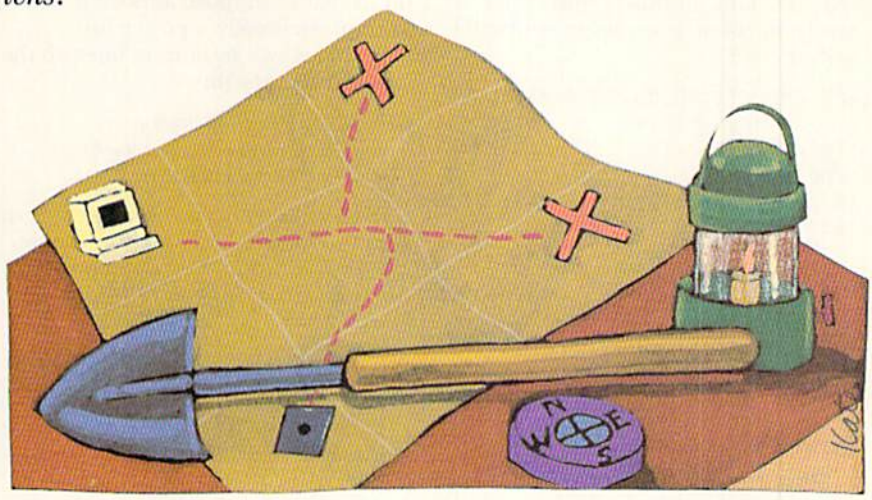
128 Mode

Here are some secrets that reveal an assortment of Basic 7.0 programming tricks.

By MARK JORDAN



WELCOME TO 128 MODE, a new *RUN* column that delves into the depths of the C-128 mother lode. Where shall we delve? Every-ware: the Vales of Software, the Hills of Hardware and the vast Regions of Else-ware. That should keep us busy for quite awhile!

One of the great joys of C-128 computing is digging out secrets of the machine: back doors, undocumented routines and alternative power uses. For our first expedition, we'll look at several of my favorite programming tricks.

Round and Round

How would you go about programming a sprite to move in a circle? Here's a sneaky way you might do it in Basic.

```
10 GRAPHIC1:GRAPHIC0          :REM*102
20 X=160:Y=150                :REM*114
30 SPRITE1,1,2                :REM*205
40 FORT=0TO360 STEP 5         :REM*153
50 LOCATE X,Y                 :REM*179
60 LOCATE 50;T                :REM*168
70 MOVSPR 1,RDOT(0),RDOT(1)
                              :REM*233
80 NEXT                       :REM*210
90 GOTO 40                    :REM*218
```

The trick involves using graphics commands (in this case, Locate and RDot) to move the pixel cursor around. The key lies in using the special notation Basic 7.0 allows for moving the pixel cursor a certain distance and angle from a starting point, as line 40 demonstrates. (See page 279 of your *C-128 System Guide* for more details.) By having the sprite follow the pixel cursor (line 50), you can use graphics commands to move sprites in unusual ways.

Want a smoother sprite orbit? Remove the STEP 5 in line 20. But be prepared for a slower waltz. You could get around this limitation in a program by using arrays to hold the X and Y coordinates, or you could use the following little machine language interrupt routine. Type it in and run it, and you'll find that every time you execute a graphics drawing command, sprite 1 will move with the pixel cursor.

```
10 FORT=0TO45:READA$:POKE3072+T
   ,DEC(A$):NEXT              :REM*37
20 GRAPHIC1,1                 :REM*158
30 SPRITE1,1,2                :REM*205
40 SYS3072                    :REM*145
50 DO:CIRCLE 1,170,100,70,50:LO
   OP                         :REM*15
60 DATA 78,A9,0D,8D,14,03,A9,0C
                              :REM*87
70 DATA 8D,15,03,58,60,AD,33,11
                              :REM*41
80 DATA 18,69,28,8D,D7,11,AD,32
                              :REM*168
90 DATA 11,29,01,F0,08,AD,E6,11
                              :REM*45
100 DATA 09,01,8D,E6,11,AD,31,1
    1                         :REM*201
110 DATA 8D,D6,11,4C,65,FA
                              :REM*96
```

Graphics commands such as Draw and Box happen too fast to help much with this routine, but Circle is loaded with potential. Page 249 of the system guide shows how to make ellipses, octagons, diamonds and triangles. With the above routine, your sprites can do the same.

Save the Rasters!

Rasters are the "television lines" that make up a monitor screen's image. On the C-128 there are 200 of these horizontal lines (400 in Interlaced mode, but that's another article). They disappear about as fast as they're painted onto your screen, but, thanks to some creative use of SShape, you can save them and then do interesting things with them.

Such as? Such as wavy screen displays, stretched out and slanted text, and, as this little program illustrates, a herringbone character display.

```
10 COLOR0,4:COLOR1,4:GRAPHIC1,1
                              :REM*224
15 SPRITE1,1,2                :REM*188
20 FORT=0TO1:CHAR1,10,T,"VOILA!
   {2 SPACEs}HERRINGBONE":NEXT
                              :REM*146
30 FF=1:COLOR1,1              :REM*200
40 FORT=0TO15                 :REM*253
50 SSHAPE A$,0,T,319,T        :REM*192
60 GSHAPE A$,OF,T+88          :REM*70
70 OF=OF+FF:IFOF=70ROF=0THENFF=
   -FF                        :REM*74
80 NEXT                       :REM*210
```

Line 50 is the raster-saver. When using SShape, the last four parameters are the upper-left and lower-right coordinates of the area to be saved. Note that this routine saves just one skinny line of the graphics screen each time through the For-Next loop that starts in line 40, and that it works from the left side of the screen (0) to the right (319) but on the same vertical line (T) each time.

Line 60 plays with these saved rasters by using GShape, SShape's fraternal twin. By using an offset to place the raster back down (the OF in lines 60 and 70), a zig-zag pattern is easily achieved.

This technique is powerful, and I promise to dedicate a full column to it in an upcoming issue.

Keying on the Fly

The 128-mode Key command is very popular because it provides what 64 mode can't: user-definable function keys. It does this by placing characters in a queue waiting to be processed by the operating system.

One oft-overlooked benefit of Key is ►

ILLUSTRATED BY KATE BRENNAN HALL

that you can use it while a program is running. Let's say you're writing a little database of some sort and want to give the user the convenience of having to type in long phrases only once—a macro of sorts. You could use the following code:

```
1ØØ INPUT"TYPE IN YOUR MACRO FO
    R THE ";K1$          :REM*46
11Ø KEY1,K1$             :REM*67
1ØØØ DO                  :REM*215
1Ø1Ø GETKEYA$:PRINTA$;   :REM*155
1Ø2Ø LOOP                :REM*236
```

Then, whenever you press F1, the whole string of characters you typed in line 100 will get processed just as if you were typing them afresh. Try this trick in a program of your own; it's potent and easy to do.

Power Keying

Listing program lines is about the most mundane thing a Basic programmer does, and using the function keys to do it is a natural. In fact, F7 comes defined to list lines.

But there's listing and then there's "listing"—power-listing, that is. Here are three tips:

1) Define your list lines like this:

```
KEY 1,"{CTRL/4} {CLR-HOME}
COLOR0,1:COLOR4,1:SLOW:GRAPHIC0:
LIST(starting line#)-(ending
line#)"+CHR$(13)+ "{CRSR UP}{CRSR
UP}"+CHR$(27)+"@"
```

This will always bring you back into Edit mode with the screen, cursor-color and Graphics mode of your choice, no matter what you were doing before. (Of course, you should change the specifics to suit yourself.) And it will shut off that annoying Insert mode (escape/A) you might have been using, as well as get rid of that even more annoying Ready prompt. Definitely a power list!

2) To list two sections of lines on the same screen, try this:

```
KEY 1,"LIST(starting line#)-
(ending line#):LIST(starting line#)-
(ending line#)"+CHR$(13)
```

Works like a charm, as long as there aren't too many lines in either range.

3) BSave your key definitions for whatever program you're working on. Here's how:

```
BSAVE "KEY.THIS.PROGRAM",B0,P4096
TO P4352
```

Then include the following line as the first one in that program you're working on:

```
BLOAD "KEY.THIS.PROGRAM"
```

Now, every time you boot up to work, your keys will be ready to go.

Off-Keying

For richer, fuller sound effects, mistune all three C-128 voices just a little. That's right, make them sing off-key. The result, unlike human singing that's off pitch, is pleasing. And it's easy to do: Simply adjust very slightly the second parameter in the Sound statement. Try this one from the keyboard:

```
1Ø SOUND1,5ØØØ,5Ø:SOUND2,5Ø2Ø,5
   Ø:SOUND3,5Ø4Ø,5Ø      :REM*2Ø6
```

Alas, the Play statement is set in ROM and is mathematically tuned. Another case of perfectionism gone awry.

Taking CMD of Things

Almost everyone uses CMD to do one thing only: print program listings. That's like using your biceps just to check your watch. CMD has got muscle—use it.

Use it to save to a disk file anything you can print on the screen: program lines, machine language listings, screen dumps, variables, and so on. Here's what you need to type in to start the process:

```
DOPEN #2,"TEMPORARY",W:CMD 2
```

Now, anything that would normally go to the screen will be saved to the disk. I used this technique to save all the listings in this article. First I typed the routines in Basic and tested them. Then I opened a temporary file as above. Next I typed LIST. . .but nothing showed up on the screen, of course, because the output was going to the disk. Then I closed the file (a crucial step—just type DCLOSE and hit the return key when you're done). Finally, I booted up my word processor, found the file and loaded it, confident that it would be free of mistakes.

Okay, shovels up. We didn't dig very hard or very deep, but we have exposed a few handsome nuggets. As time goes by, we'll discover lots more. Until next time, keep digging! ■

Mark Jordan, a high school English teacher by profession, has been programming Commodore computers since 1983.

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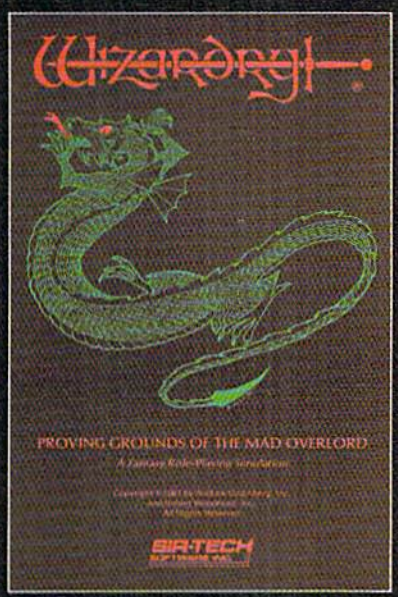

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GOLD MINE

Welcome to the Gold Mine, an exciting and helpful compilation of game tips for C-64 and C-128 users.

By LOUIS F. SANDER

FOR ALMOST TWO YEARS, Gold Mine's gaming tips have been one of the most popular features in *Commodore Magazine*. Now that it's joined *RUN*, even more readers can gather nuggets from the Mine.

For those new to the column, Gold Mine has tips on game play for the C-64 and C-128, submitted by readers from around the world. It emphasizes tips from recent bestselling games without overlooking past favorites.

While we try to ensure that all of the tips will work as published, you should be advised that some tips work only on certain 64 or 128 configurations.

ARCTICFOX: If fighters are chasing you, head for a mountain or the force field. They may shoot, but if you're close enough to the obstacle, they'll slam into it, ending that battle.

—JEFF COX
BREVARD, NC

THE BARD'S TALE III: After you complete the Chaos dungeon, you can make new characters, then take them in with the rest of the group to kill Brilhasti again and again. This will give the new characters about 35 levels. It's best to have Bede or Heal before trying this.

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You need a longbow and black arrows to kill Sceadu.

—STEVE & LINDA SEIDL
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MONOPOLY: To give or receive cash when two players are working together, select the Trade option. Use the Quit option within the Trade option to select no property for either player. Then enter an amount after the Cash Amount prompt.

—GENE LETELLIER
ADDRESS UNKNOWN

OUT RUN: Always try to have the Ferrari pushed to the max by the first turn of the game. Also, keep the joystick pushed forward and take the inside lane on the turns. Let the car sort of glide across the lanes.

—ACE
ADDRESS UNKNOWN

ULTIMA IV: Do not kill creatures fleeing from you after battle. It will make it harder for you to become an avatar.

Help others whenever you can. Give generously to the poor, and donate units of blood to the Mystic Healer in Skara Brae. He is located on an isle near Spiritwood, roughly southwest of the Great Castle.

Many items are "buried" in the ground, so you may have to search three or four times for them. Each search is equivalent to digging deeper.

—PETER LALTOO
SAN FERNANDO, TRINIDAD

CONTRA: At the bottom of the waterfall stage, jump up to the next ledge. As soon as you get there, shoot the pillbox twice and jump down again. Wait for the enemy to pass; then jump up again, jump across and get your barrier. You should now be able to jump straight up to the top without being killed.

—BRADLEY POCATELLO
ADDRESS UNKNOWN

POOL OF RADIANCE: Do you ever have problems where your players don't seem to have enough hit points or experience? Here's a solution.

When you create your player, put him in the party only. Get his or her equipment, then head to the training center and enter the sparring room. When asked if you want to spar, answer no. You'll then be asked if you want someone to join your party. Answer yes, and get a group of fourth level fighters or other people.

By the way, you can tell the level of the NPC by the number of shares they ask for. For example, two shares indicates a second or third level NPC.

After you have a high-level player, you can go back to your original disk. Remove him from your party, and he'll be saved to the disk. After a while, you'll have lots of high-level people on that disk. Restart the game by rebooting and creating a new party.

—CHAD EVANS
FREMONT, IN

DESERT FOX: Try to avoid Ambush, Convoy and Minefield conflicts, because you are most likely to be damaged in them. Send the planes to Pardia; then go first to the battle closest to Tobruk. Head northeast from there, where there are only a few encounters. Finally, head to either battlesite.

—CHARLES MURACH
LANSING, IL

EOS: EARTH ORBIT STATION: On the Search for Life mission or any long mission, play with all four players, using one of them for money. Use one player for research and another for exploration. Trade tech points and money between players.

—RYAN FILLMORE
GRIDLEY, CA

IKARI WARRIORS: At the start of each new level, a tank appears halfway up the screen. Instead of risking a life to get it, you can move one or two inches to the right of the screen. When you get there, pull back on your joystick, press the firebutton and the grenade button at the same time. You'll automatically be in your tank. This works on both the first and the second tanks.

—JOHN ERICSON
NEWINGTON, CT

HOLLYWOOD HIJINX: To get up to the fourth floor, fill the rusty bucket with water from the pond. Then enter the closet and hang the bucket on the third peg. Now, quickly go up the stairs, go on top of the closet and wait. The ►

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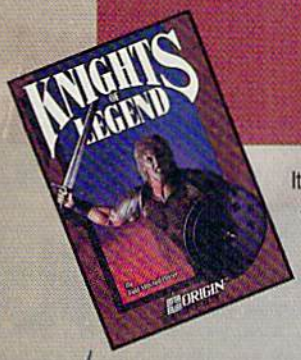

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closet will move up in a couple of turns.

The buttons in the game room have the following functions: Red shoots flame; White swipes at both puny planes; Blue grabs the ring from the monument; Black stomps on tanks and radar truck; and Green moves.

On the piano, play the song you heard in the film room. When the door opens, go down and get the South pillar, then go up and push the piano south. Go back down and get the North pillar, then enter the passage to find the parking meter.

—SPC Jeff Collins
APO, NY

The Legend of Blacksilver: To increase your hit points to the maximum of 200, go to any of the temples. When the priest asks you for a tribute, offer the same number of gold pieces as the number of hit points you need. It works every time.

The Tongue of Flame magic spells are good investments, costing only 25 gold pieces. They pay for themselves in no time if you use them to kill monsters.

King Dureck's Castle is by the ocean, south of the Iron Forge.

At the Metal Works display, use the blue gem that you found at Dureck's Castle. Then buy an Armor Enhancement spell and cast it on your armor.

—Tommy Dyer
Jacksboro, TX

The Three Stooges: In the hospital, try to stay in the middle of the hall, and don't run too fast. In boxing, stay on one side of the street; you can make it on time by running slowly. In Cracker, wait for the oyster to come up.

—Alex Mau
Brooklyn, NY

Wasteland: When you're ready to start a siege on the Outlaw Hideout in the city of Quartz, you can surprise them by attacking from the roof. To do this, go to the Space of No Design, between the Outlaw Hideout and the building to the left. Remember to bring a rope and something to break the glass skylight with.

When you're badly wounded on the second level of Base Cochise, you need to get back to the surface. Just go to the one-way force field to the left of the stairs. This will take you to the beginning of level one.

—Bill Jentarra, Jr.
Tonopah, NV

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GAMES GALLERY

These mind games challenge you to outthink, not outshoot, your computer opponent.

By BOB GUERRA

I ADMIT IT. I enjoy obliterating aliens as much as the next person. For me, there's something relaxing about zapping away my problems with a laser pistol, especially after spending the day dealing with problems that aren't as easily eliminated. Sometimes, the idea of actually using my brain to win a computer game seems like cruel and unusual punishment.

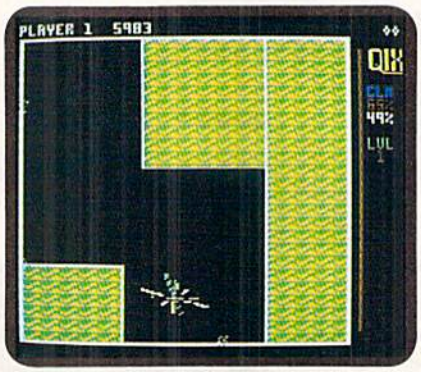
There are, however, those occasions when my brain rebels. Maybe it's lack of stimulation, or perhaps it's guilt. Whatever the reason, my gray matter sometimes seems to scream "use me!" When this happens, I could happily tackle a *New York Times* crossword puzzle, try to figure out what my kids see in Pee Wee Herman or even attempt to program the VCR.

Instead, I usually reach for a different type of computer game—one that will give my mind as much of a workout as my joystick. Here are some of the games that have recently given me reason to cerebrate. All six are entertaining, addictive and challenging. The first three appeal to the side of my brain that controls fast thinking; the second batch appeals strictly to my sense of logic and strategy.

TETRIS

How is it that a game like Tetris, which seems only slightly more complicated to program than Pong, has become one of the hottest computer games? Perhaps more important, why did we let the Russians think of it first? Spectrum HoloByte's Tetris has already earned itself a place in the Computer Game Hall of Fame because of its deceptively simple, yet addictive, gameplay—a cliche I know, but it is true. The program's status as a classic is confirmed by the recent appearance of Tetris-inspired games like Accolade's Mental Blocks (see below) and California Dreams' Blockout.

In case you've been hopelessly lost in a dungeon for the past few years, here's how Tetris works. You begin with an empty pit. Various shaped blocks fall, one at a time, into the pit. Each block is made up of four small squares; some resemble the letter L, others look like T, and so forth.



Qix dares you to avoid getting zapped by its charge of electrical energy.

The blocks fall slowly at first, but their speed increases as the game progresses. Your job is to use your joystick to guide the falling blocks into place, rotating them if necessary, to form complete layers of blocks across the pit. Points are scored for every block that enters the pit and for finishing rows.

You don't need an extensive mental database to excel at Tetris—just a turbocharged CPU. Early on, when the blocks are falling slowly, Tetris is fairly easy to play. As the blocks speed up, however, and your uncompleted rows begin inching toward the top of the pit, it takes a quick and decisive mind to analyze the situation and slide each new piece into place. For a game with "blocky" graphics, Tetris is pretty hard to resist.

QIX

Back when every lunchtime saw the arcades packed with truant school children and businessmen in three-piece suits, Qix was one of the hottest coin-ops you could drop a quarter into. Its relatively slow pace and strategic challenge set it apart from games like Defender and Pac Man and made it a favorite among "thinking" arcade addicts. Thanks to Taito's faithful reproduction of the coin-op classic, you can now play Qix at home.

Qix (pronounced "Kicks") is a drawing game that challenges you to fill in at least 65 percent of the screen with blocks of any size or shape that you choose to draw. As each block is completed, it is filled with a colorful pattern. However, roaming around the screen along with your drawing cursor is an unpredictable surge of electrical energy—Qix—which can zap any line that has yet to be closed into a solid block. So, you are vulnerable whenever you're attempting to complete a new block. If you play it safe for too long, however, you'll be forced into action by deadly Sparx that travel along the existing lines.

The main strategic dilemma here is whether to draw with bold strokes in an attempt to fill large chunks of the screen as quickly as possible, or to patiently build a network of smaller blocks that can eventually be linked with short lines to form larger sections. For advanced players, however, the real challenge is in trying to trap Qix in as small a space as possible.

MENTAL BLOCKS

As I mentioned above, Mental Blocks is a game that seems, at least in part, to have been inspired by Tetris. Mental Blocks is actually a collection of three different brain-teasing contests. The first game, Free Fall, has two variations—one that's essentially identical to Tetris, but another that lets you fill a three-dimensional pit with three-dimensional blocks. Thus, you can rotate the falling blocks along three different axes and slide them forward into the background as well as from side to side.

Unfortunately, the other two brain teasers are reminiscent of those multiple-choice intelligence tests to which we used to bring our sharpened No. 2 pencils. The first displays a solid box, and you're asked to select the cube's counterpart from among four unfolded patterns; the second requires you to choose the next logically following geometric shape in a series.

Mental Blocks can be enjoyed by one or two players, and high scores are saved to disk. Best of all, because Mental Blocks is part of Accolade's Avantage ►

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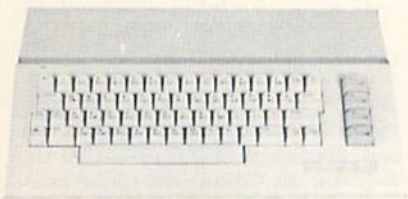

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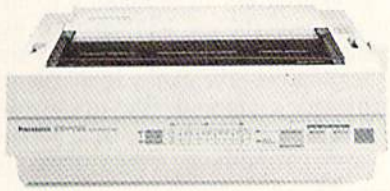

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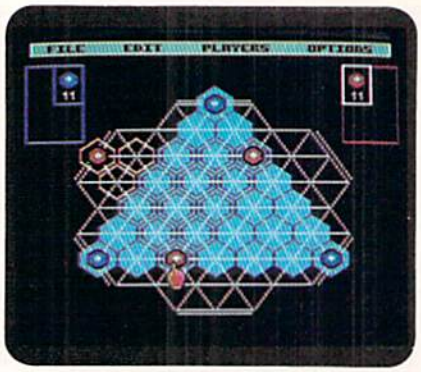

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line, it comes with a bargain basement price of $14.95.

TRIANGO

I love this game. I hate this game. That pretty much sums up my relationship with this clever little computer game from California Dreams. TrianGO is played on a grid that's made up of several small triangles. Up to four players take turns placing colored stones on the intersections of these triangles. The object is to capture other stones within triangles formed when three stones of the same color are joined by lines on the grid. Whenever you perform a capture, your opponent's stones are removed from the game. However, any of your stones that were part of the capturing triangle can be played again. You lose if you run out of stones.

TrianGO can also be played solo against the computer. Even though the game is easy to learn, and most players have a fairly good idea of what it takes to win, the computer is a very tough opponent, even on the novice level. Once you begin to consistently win against the computer's novice level, there are four tougher levels to challenge you: intermediate, expert, master and grand master.

The fact that I seldom beat the computer, even on the novice level, is what I hate about TrianGO. What I love about the game is the wide variety of options. Besides multiple skill levels, the game also offers three levels of on-screen hints, and the option to save games in progress. In addition, you can edit the game board, change sides at any time and undo moves right back to the beginning of the game. If you want a game that's guaranteed to make you think (about your own inadequacies as a player, if nothing else), then try TrianGO.

RISK

One of the most recent of board games to make the transition to floppy disk is Risk, a contest of strategic planning in which two to six players (either human or the computer) compete for world dominance. Mastertronic's Risk is played on a map that divides the world into six continents comprising 42 individual territories. You begin by placing armies on unoccupied territories until all have been claimed. Then you can go on to distribute additional armies to reinforce your territories.

Define your territories in Risk.

On each subsequent turn, you get a number of armies based on the number of territories and continents you control. After these armies are placed, you can attack adjacent territories in an at-

Table 1. Hints and tips.

Tetris and **Mental Blocks**:

—The faster you drop a block into place, the more points you'll receive for it, so try to work as quickly as possible. Learn to judge exactly where a block will land while it's still high in the pit.
—Avoid using the ends of long thin blocks to fill small holes.
—Take advantage of the fact that Tetris shows you the next block ahead of time. Try to plan your positioning two blocks at a time.

Qix:

—Draw thin columns (made up of many small blocks) to divide the playing field into halves or, if possible, quarters.
—Wait until Qix works itself down into one of the corners and trap it by closing off that quarter.
—Remember, you get more points for sections you complete when using Slow Drawing mode. Therefore, use Fast mode until only a short line is required to complete a large section; then switch to Slow mode.

TrianGO:

—TrianGO is not won by capturing all of your opponent's pieces, but by being the last player to make a legal move. So, your goal should be positional control of the board.
—Don't give up control of a large section of the board just to capture a few of your opponent's stones. Instead, fill triangles that are eligible for capture with your own stones so that when you do capture, you'll get back a lot of stones that are replayable.
—Don't place stones in the center of the board unless you already control the area. Also, don't create triangles that can be easily destroyed when your opponent captures.

Risk:

—If you select your own territories, try to grab *all* of the territories on a single continent at the outset. Depending on the continent you control, this could give you between two and seven extra armies on each turn.
—If you do capture an entire continent, defend your borders well so you can withstand enemy invasions.
—Don't spread yourself too thin. It's better to have a small invincible empire than a large one that's in danger of collapsing under its own weight.

Chessmaster 2100:

—Take your time—the computer's got all night. You can even shut off the on-screen game clocks if it helps you to relax when playing.
—While the 3-D board looks great, it might be easier to analyze your position while playing on the 2-D board. Remember, you can switch between boards in the middle of the game without disturbing the pieces.
—If the computer has a weakness, it's during its middle game. Try to set up a strong defensive position early, while looking for weaknesses in the computer's position.

tempt to expand your empire.

Battles are decided by a roll of the on-screen dice. Before ending your turn, you can fortify your position by moving armies from one occupied territory to any adjacent territory that you also control. This usually means taking armies from a well-protected interior territory and placing them on a more vulnerable border territory.

Needless to say, the initial placement of armies is quite important. You should try to occupy large chunks of adjacent territories in specific continents with the eventual goal of conquering and fortifying the entire continent. Also, remember that not all continents are created equal. Controlling Asia, for instance, earns you seven new armies per turn, while controlling South America or Australia only nets you two.

CHESSMASTER 2100

Finally, what better way to look intelligent than by playing the greatest of all board games, chess, against the computer. For my money, the best chess game available for the C-64 is Chessmaster 2100, from The Software Toolworks. Chessmaster is a worthy opponent for even the most experienced chess player, and it's also an excellent teacher for young players or anyone new to the game.

Pros and novices alike will be challenged by Chessmaster 2100.

In the Teaching mode, Chessmaster shows you all the possible moves for a selected piece. You can even ask Chessmaster to suggest the best possible move or watch it "think" as it considers its next move. In addition, the manual provides a tutorial and ten chess brain-teasers to challenge your ingenuity.

The flip-side of the program disk contains 110 classic chess games from as early as 1834 to 1988. These you can load, watch and analyze. Then, the next time you want to impress your chess-playing friends, you can casually bring up "Gary Kasparov's brilliant use of the Sicilian Defense in the 24th match game against Anatoly Karpov." ■

Bob Guerra, editor for a Boston hospital, keeps a seemingly endless stream of software reviews coming RUN's *way.*

Table 2. Retail prices and manufacturers' addresses.

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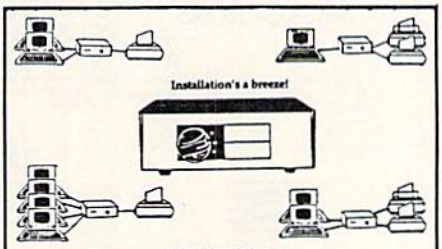

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RAMBOard does just what the other copy card on the market does: it adds RAM to your 1541 disk drive. This RAM is used to create a workspace where custom software can work its magic. Copy protection is evolving past the point of nibblers and other software-only solutions. Believe us, card based copiers are the future of archival technology.

So how do you decide between our card and "Brand X"? Don't compare the similarities - compare the differences. Their card is just "out there". You buy it, and that's pretty much it. RAMBOard was designed from the very beginning as an integral component in Maverick ™, a complete system of archival tools and products. Their card puts the burden of the work on you. Are you good at soldering? You better be - their card REQUIRES it. On the other hand RAMBOards require NO soldering to install, the only exception being a handful of older 1541C's. That's not all - the other guys say they don't use parameters, but what they really mean is they don't WRITE parameters. The user is required to make special critical "copy adjustments" to copy software. Sounds like creating parameters to us. On the other hand, RAMBOard uses Maverick parameters, designed by experts to instantly and easily copy today's toughest titles. So when the other guys say that their card will copy "everything", that may be true - providing that you can figure out the proper "copy adjustment" settings for everything. Good luck!

The differences go beyond the product itself. Software Support International is the company that began with the award winning Kracker Jax series of archival parameters. Our customer support system has earned industry praise, and we've established a reputation for honesty and integrity. A close look at the track record of the other guys will show just how deep our differences run. So when you're ready to get involved with the future of archival technology, pick RAMBOard - a product you can trust, from a company you can trust.

The RAMBOard
1541/1541C Version: $34.95
NEW **1541 II Version: $44.95**
1571 Version: $49.95

ATTN. C-128D Owners — The 1571 RAMBOard is for external drives only.
The RAMBOard is an optional Maverick accessory

ALL NEW

FasTrac/128 by Mike J. Henry

Look Who's Come Out Of The Basement

ALL NEW

At Software Support International, we've gained a reputation for providing Commodore owners with the products they need to get the most out of their computers. We've never hesitated to do whatever it took to provide you with the best software on the market. So when we decided to produce the ultimate 128 utility system, we went looking for one of the ultimate programmers.

We found him.

Mike J. Henry, the brilliant young programmer who was the driving force behind the "Basement Boys", the software team that created the phenomenal Fast Hack 'Em, has turned his considerable talents onto the 128. The result: FasTrac 128, the TOTAL utility system for your 128.

Here's a list of the major features found in FasTrac 128. ALL use both 40 and 80 column outputs and are PAL compatible for our overseas users. Read carefully -FasTrac 128 does some truly amazing things:

- **FasTrac/128 Disk Copy:** Single or dual drive · Copy with or without verify · Copy in 1541, 1581, or true 1571 formats · 1764-1750 RAM expansion support · 64K video RAM support · Uses the 128's additional memory.
- **FasTrac/128 File Copy:** Single or dual drive · File Copy between ANY two Commodore compatable Drives including the SFD-1001, MSD drives, hard drives, and others · Copy in 1541 or true 1571 formats · 1581 file copy with partition support · 1764-1750 RAM expansion support · 64K video RAM support · Uses the 128's additional memory.
- **FasTrac/128 M/L Monitor:** Go ANYwhere in memory · Access both main banks · Full scrolling in both directions · Includes scrolling DriveMon.
- **FasTrac/128 Directory Editor:** Edit and organize ANY standard directory · Edit 1541 or true 1571 formats · Edit 1581 directories with full partition support.
- **FasTrac/128 IBM ™/MFM Disk Copier:** Copy standard IBM formatted 360K 5.25" disks with your 1571 drive (required) · 1764-1750 RAM expansion support · 64K video RAM support · Uses the 128's extra memory to copy in fewer passes.
- **FasTrac/128 1581 Duplicator:** Single or dual drive · 1764-1750 RAM expansion support · 64K video RAM support · Uses the 128's additional memory · This is the fastest 1581 to 1581 copier ever created!

Quite a package, eh? We don't want to mislead you - FasTrac 128 is NOT for copying protected software. Our own Maverick ™ already has those bases more than covered. FasTrac 128 was designed to allow serious 128 users to get total control of their computers. If you want to own the finest set of utilities ever made for the Commodore 128, we've just made it a lot easier - we've told you the name . . .

Mike J. Henry's FasTrac/128
Only $34.95

ATTN. REGISTERED Maverick Owners ONLY: You may buy ONE (1) copy of FasTrac/128 for only $20.00
This offer is ONLY for orders placed with Software Support.

ALL NEW

THE 1581 TOOLKIT V2

If You've Been Waiting For A Sign, This Is It.

ALL NEW

Introducing the 1581 Toolkit Version 2, the newest incarnation of the best program you can buy for your 1581 disk drive. How good is it? Well, V1 received 4 1/2 of a possible 5 stars from INFO ™ magazine - and V2 is even better. What can it do for you? Picture using your 1581 with a:

- ★ **Fast Disk Copier**
- ★ **Fast File Copier**
- ★ **Byte Pattern Search**
- ★ **Partition Creator**
- ★ **Ultrafast Formatter**
- ★ **Track & Sector Editor**
- ★ **Directory Editor**
- ★ **Error Scanner**
- ★ **Relocatable Fast Loader**
- ★ **File Track & Sector Tracer**

And V2 adds many new or enhanced features, like the fact that both our single drive fast data copier and fast file copier now support the 1764-1750 RAM expansion units for super-fast one pass copies, or like our 64k video RAM support for 128 owners! And remember also that all of our 1581 Toolkit utilities use hyperfast read/write routines and, wherever appropriate, allow full access to partitions.

So whether you're thinking about buying a 1581 drive or you already own a 1581 drive, we guarantee you'll never really USE a 1581 drive until you've got your hands on the 1581 Toolkit.

NEW LOW PRICE:
THE 1581 TOOLKIT (3.5 disk) . . . . . NOW ONLY $24.95!

VERSION 1 OWNERS: Upgrade to V2 by Sending us your Original Toolkit V1 disk along with $9.95 plus S/H

Ever wish you knew more about your 1581? David Martin's book, "The 1581 DOS Reference Guide", is what you've been wishing for. Martin's invaluable resource holds over 100 pages of detailed information that took over a year of solid research to compile. This exhaustive manual will show you the inner workings of the 1581 as nothing else can. Order now, and we'll include some additional utilities like a machine language monitor with DriveMon - the perfect companion to The 1581 DOS Reference Guide!

THE 1581 DOS REFERENCE GUIDE / $14.95

SPECIAL OFFER: GET BOTH THE 1581 REFERENCE GUIDE AND THE 1581 TOOLKIT FOR ONLY $34.95

THE 1750 CLONE

Are You Overdrawn At The Memory Bank?

Ah, the venerable Commodore 64/128. Stock, it has better sound than an Atari ST. Better graphics than a CGA equipped IBM. And more memory than....

Uh-oh.

As powerful as the Commodore is, memory has always been its weak spot. Some brilliant programmers have found some ingenious ways to work within the computer's very limited available RAM, but the fact remains that you can only go so far with 64 or even 128K. But you can go MUCH further with 512K.

The bad news is that Commodore's own 1750 512K RAM Expansion Unit (REU) is expensive and almost impossible to find. The good news is, we did something about it.

We bought brand new Commodore 1764 REU's, which come with only 256K of RAM. Next, we installed a 256K upgrade which was custom engineered to our demanding specifications. Once modified, we tested each and every unit and warranted them to be free from defects. The final product is called the 1750 Clone, and it's all the room you'll ever need on a simple plug in cartridge.

Once on board, you'll have a whopping 512K of RAM - the SAME amount of memory found on the Amiga 500. Your Commodore will operate at advanced levels of performance that the original designers never even dreamed of! You'll be amazed at the enhanced capabilities of software that takes advantage of the 1750 Clone, programs like GEOS, PaperClip III, and our own Maverick, to name a few.

The 1750 Clone works EXACTLY like the original 1750. It will open the door on years of extended use from your Commodore as even newer, more powerful software appears on the horizon, software that requires the room the 1750 Clone can provide.

Twin Cities 128 magazine says they "can completely recommend the 1750 Clone." Once you see it work, you'll feel the same way. So don't buy a whole new computer just to get more memory. Get the 1750 Clone instead -and get another decade of satisfaction from your Commodore.

IMPORTANT NOTES - READ CAREFULLY

C-64/64c (but NOT C128/128D) owners MUST buy a heavy-duty power supply to use these units. The power supply is NOT included - it is available from us separately. If you ALREADY own a 1764 RAM cartridge, we can upgrade it for you. Your unit MUST be in perfect working order for us to upgrade it. The turnaround time on upgrades is approx. 2 weeks. It will NOT be necessary for you to purchase a new power supply - the one that came with your 1764 will still work fine.

THE 1750 CLONE ONLY $199.95
1764 UPGRADE ONLY $124.95

C-128 VIDEO RAM UPGRADES

For 128 Owners Who Refuse To Be Left Behind

When Commodore first released the new 128D, we got one, opened it up, and took a good look. It didn't take long to discover one MAJOR difference. The standard C-128 has just 16K of video RAM, while the newer 128D has 64K- 400% more!

We knew that there were tremendous advantages to the extra RAM. Like being able to scroll through video memory or the potential for greatly enhanced color resolution. And, since Commodore had seen fit to make it a standard feature on all new 128D's, we knew it was only a matter of time before new software started taking advantage of the full 64K.

That time has arrived. Programs like BASIC 8, the BASIC 8 Toolkit, Spectrum 128, Sketchpad 128, and News Maker 128 have all been coded to utilize the full 64K of video RAM found on the 128D's. So if you've got a regular C-128 with only 16K of video RAM, you've got a problem. And we've got the solution.

You could upgrade on your own - but if thoughts of splattered solder and heat-damaged motherboards bother you, relax: we've developed a module that just plugs right in to your C- 128. No soldering, no hassles. Now your computer can have the same 64K video RAM as the new machines. And you'll be ready for whatever the future holds.

PLUG-IN 64K VIDEO RAM UPGRADE FOR C-128's

ONLY $49.95

Includes easy installation instructions

NEW LOW PRICE

KRACKER JAX VOLUMES 1-7

We Just Made A Good Thing Better - Without Lifting A Finger.

Kracker Jax, our ground breaking series of copy parameters, was always a superior product. When we made it, we made it right. So how can we improve it now? Easy. We slashed the price!

Each Volume of Kracker Jax allows you to make Unprotected versions of around 100 specific popular titles. No special knowledge or tools are required. Each Volume originally sold for $19.95. So if you wanted all 7 Volumes, it would have cost you $139.65. But now, you can buy each Volume for only $9.95 or, for you bargain hunters, you can buy **ALL 7 VOLUMES FOR ONLY $29.95!** That works out to a cost of only **$4.28** each!

We've also cut the price on The Shotgun II, one of the most powerful nibblers ever produced. Originally $14.95, you can now own it for only **$9.95!**

And just because there's a remote chance that it might be your birthday, we'll go one step further: Buy the Kracker Jax Volume 1 -7 package for **$29.95,** and we'll throw in The Shotgun II nibbler **FREE!** Quite a deal, huh? But if you want it, better hurry - supplies are limited. After all, nothing good lasts forever.

SOFTWARE SUPPORT INTERNATIONAL

Circle 17 on Reader Service card.

PLEASE READ BEFORE ORDERING: We accept money orders, certified checks, VISA, M/C and, Discover. Previous Software Support customers may use C.O.D. and personal checks. Orders shipped to U.S.A. (48 states), F.P.O., A.P.O., or possessions, please add $3.50 per order for S & H. U.S. shipping is by UPS ground in most cases. FAST 2nd DAY AIR available: add $1.00 per pound additional (U.S. 48 states only). Alaska or Hawaii (all orders shipped 2nd day air), please add $7.50 per order for S & H. C.O.D. available to U.S. customers only (50 states): add $2.75 along with your S & H charges per order. Canadian customers may calculate the S & H charges by including $4.00 (minimum charge) for the first two pieces of SOFTWARE and $1.00 for each additional piece per shipment. All monies must be submitted in U.S. funds. Canadians must call or write for hardware shipping charges. Foreign customers must call or write for shipping charges. Defective items are replaced at no charge if sent postpaid. All in stock orders are processed within 24 hours. U.S. SOFTWARE orders over $100 will be shipped 2nd Day Air at our regular $3.50 S & H charge (48 states only). Washington residents please add 7.6% additional for Sales Tax. All prices subject to change. All sales are final unless authorized by management.

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2700 NE Andresen Road / Vancouver, WA 98661

Or call our toll-free order line at 1-800-356-1179. 6am-5pm Monday-Friday Pacific time
Technical support available. Call (206) 695-9648. 9am-5pm — Pacific time, Monday-Friday.
Orders Outside USA call (206) 695-1393.

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DEALERS — WE HAVE THE SUPPORT YOU'RE LOOKING FOR!

GEOWATCH

Here's how to make your own greeting cards using geoPublish, with an assist from geoPaint.

By DOUGLAS BAYLES

THERE ARE MANY programs on the market for designing and printing out greeting cards. They may be menu-driven and easy to use, but most of them are so structured that they limit you severely in creating your design—for example, allowing you to use only one graphic per section. And you don't really have true freedom of choice as to where you put your graphic, but must place it in one (or more) of the predetermined locations permitted by the program.

If you own GEOS and a copy of geoPublish, however, you no longer have to settle for all those limitations. GeoPublish allows you great flexibility and is capable of utilizing clip-art graphics from Print Shop, Print Master and Newsroom, thanks to the GEOS Graphics Grabber. Here is a guide to help you use geoPublish to produce your own truly distinctive greeting cards just as easily as you could with those other programs.

You will need two work disks—one for geoPublish and one for geoPaint. First set up a geoPublish work disk with geoPublish, your printer file and the Photo Manager. Then set up a geoPaint work disk with geoPaint, Photo Manager and any fonts you intend to use. If you wish, you may include any photo albums and/or the Graphics Grabber; or you can create your own graphics with geoPaint.

The Creative Process

The next thing to do, of course, is to decide what you want your card to look like. I've chosen a birthday card for my daughter as my example. I want the front to have a picture of a birthday cake with the word "HAPPY" above it, "BIRTHDAY" below it, and her age on it, and I've chosen the Dwinelle font for this. (It's a good idea to use a font the same size or slightly smaller than you want the finished product to be.) Inside the card, I've decided to use a Print Shop graphic called Sunshine, with the caption "Many Happy Returns of the Day!" For this, I chose a font called Spats, because it looks like peppermint sticks, and she loves peppermint.

Once you've decided on a design, and your work disks are ready to go, open geoPaint and create the file "Card. temp". This is just a temporary file to use in setting everything up for geoPublish. Start by importing, drawing or pasting the graphic you want to have on the front of your card. Then, using the Edit Box tool, create a photo scrap by selecting Copy from the Edit menu.

Now select the Photo Manager from the GEOS menu and create a new album called "Card Stuff". Paste the photo scrap into the album and return to geoPaint. Clear the work space or move to a clear space on the canvas. Then select the Text tool from the toolbox and enter each word or phrase (the shorter the better) in the desired font, saving them to the photo album just as you did the graphic. When you've saved all the pieces that will go on the front of your card, it's time to start on the inside.

This is done basically the same way, with one important difference: each graphic, word or phrase must be turned upside down before it is saved to the photo album. To do this, click twice on the Rotate button in the bottom toolbox just before you copy the graphic or word to the photo scrap. (It's better to use the Rotate button than the Mirror-Y button, because text will be printed backward if you simply invert it. Of course, you could use Mirror-Y and then Mirror-X, and it would look okay, but that's two separate buttons.)

When you have everything you want on your card (except for borders) saved into one photo album, exit geoPaint to the deskTop and copy the photo album "Card Stuff" to your geoPublish work disk. Open geoPublish and create a new file called "The Card". Now you create a Master Page. Select Master Page from the Mode menu and set the following horizontal guidelines, using the ruler along the left side of the paper: ½, 5, 6, and 10 inches. (See Figure 1.) Do the same for the vertical guidelines, setting them at ½, 3¾, 4¾ and 8 inches. The front of your card will be the bottom right quadrant and the inside will be the top left.

This would be a good time to save your Master Page to a library so you won't have to redraw it each time you create a new card. I suggest you establish a new Master Page Library just for your cards, since you are not tied to just one format. Refer to your geoPublish manual for instructions on creating libraries, or simply select Library from the File menu and follow the prompts.

While still in the Master Page mode, activate the Snap function in the Options menu. Now select the Polygon tool from the toolbox and create a box in the upper left quadrant by clicking once in each corner formed by the innermost guidelines (double click on the last corner). Do the same thing in the lower right quadrant. These boxes form the borders and, of course, are optional. Now you should also save this Master Page to your library, so you won't have to recreate it every time you want this standard style card.

The Graphics

Now you're ready for the graphics. Select the Page Graphics mode from the Mode menu and click on the border line in the bottom right quadrant. Select the Attributes tool, and you'll be presented with a dialog box that allows you to change the width of the border and select a pattern for it. (By the way, there are some public domain applications out there that permit you to design your own patterns for GEOS.) To see your border in its true form, you have to select Zoom from the Display menu; but for now, trust me—it will be what you selected.

At this point, it's time to start placing everything from your photo album onto the card itself. I usually start by putting my graphics on the page, but you can place the text photos first if you want. It really doesn't matter, since geoPublish is so versatile that it lets you rearrange everything time and time again! After placing your text and graphic photos in their approximate positions on the front ►

ALL NEW

MAVERICK ™ V4

PLEASE Don't Call Us The Best Copy Utility On The Market!

We've always been known as the best Commodore copy utility made. But that label just doesn't fit us anymore. Because Maverick is so much more than just a copy utility. Over its life span, Maverick has evolved into a total software management system capable of extending the abilities of your Commodore computer well beyond its original capacity.

Maverick V4 continues the evolutionary process that is transforming our original copy program into a series of dedicated modules, each component created by a master programmer, each designed to deal with a specialized task. The result is a program that creates an entire software management environment of which backing up protected software is only one part. Software Support, the company that has always pushed the Commodore further that it was ever designed to go, is proud to present Maverick V4. We've added several important new features and many dramatic enhancements to the Maverick platform. For example:

- RAMBOard™ NYBBLER: A MAJOR leap forward in protected backup capabilities, our exclusive new nybbler works with our own RAMBOard to AUTOMATICALLY shred some of the toughest protection schemes ever created! This combination of ingenious hardware and superb new software can handle many protection schemes that are untouchable with conventional nybblers alone.
- RAMBOard GCR TRACK EDITOR: This new feature, found ONLY in Maverick V4, works with RAMBOard to allow you to read, write, and even edit whole tracks at a time!
- 1581 SINGLE OR DUAL DRIVE FAST DATA COPIER: Now backup your data disks faster than ever before with your 1581 drive! 1764/1750 RAM expansion and 64K video RAM are supported!
- FILE, TRACK, & SECTOR TRACER: Identify, view, and edit any sector in any program file-fast!
- HIGH SPEED SEQUENTIAL FILE VIEWERS: Now you can view or print sequential files WITHOUT having to load the application that created those files! For example, view PaperClip™ files without waiting for PaperClip to load. File Viewers are the current rage in the IBM world -Software Support brings this advanced feature to your Commodore with the new Maverick V4!
- ENHANCED DIRECTORY EDITOR: Works with the 1541, the 1571, and now supports the 1581 disk drive! The ultimate tool for organizing your disks!
- ENHANCED TRACK & SECTOR EDITOR: Works with the 1541, the 1571 (in true double sided format), and now supports the 1581 disk drive!
- ENHANCED SECTOR MAP EDITOR: Now supports the true double sided format of the 1571 disk drive!
- ENHANCED PARAMETER MENU: Now supports two drives!
- ENHANCED BYTE PATTERN SCANNER: Perform high speed searches on 1541 disks and, now with true double sided format support, 1571 disks.
- MORE ALL-NEW PARAMETERS: Maverick V4 now includes over 450 parameters that either copy or entirely break the potentially destructive protection schemes of the world's newest and finest programs! Our parameters have always been the strongest on the market but, with our exclusive RAMBOard support, now they're more powerful than ever!

A turntable is just one component of a complete stereo system. And a copier, even the best one made, is just one module of a complete software management system. From this point on, we won't settle for just being known as having the best copier on the market. Once you see Maverick V4, you'll understand why.

THE NEW MAVERICK V4 -ONLY $34.95

NOW INCLUDES PARAMETER MODULES 1-7

Maverick V4 is available from Software Support International: Products That Work - From A Company That Cares

ALL NEW

ADDITIONAL MAVERICK V4 FEATURES

- REU support in Maverick's major modules
- 64K video RAM support in many modules
- Automatic directory recovery utility for damaged disks
- GEOS™ 2.0 64/128 1581 boot disk transfer utility
- 1541/1571/1581 fast file copier -any direction
- State of the art single or dual drive GCR nybbler
- GCR editor for the experienced hacker
- GEOS™ Parameters & Tools module
- GEOS™ desktop accessible file copier
- GEOS™ desktop accessible sector editor
- Error scanner with unique sector editor
- Single or dual drive high speed data copier
- Scrolling M/L monitor with DriveMon
- Works with ALL Commodore 64/128 computers in the 64 mode
- Extensive documentation included - over 40 pages.
- AND OUR FAMOUS SSI EXPERT TECHNICAL SUPPORT!

Attention Registered Maverick Owners: You may upgrade to the new V4

$9.95

Parameter Module #7 is also available

$9.95

(Includes Modules 2 through 7)

PLEASE NOTE: Many features now require the use of RAMBOard Available seperately from Software Support International

WELCOME TO HACK U

HACK U

A School Of Higher Learning For A Select Few.

Welcome. This is a different kind of school. Here, we will teach you about power. The power of knowledge. The power of mastering a very specialized discipline. And the power of the Commodore 64/128.

Not everyone can qualify to enter Hack U. You've got to be self-motivated - we're certainly not going to come to your house and hold your hand. You've got to be driven - mastering the Commodore can be a long journey, and is not recommended for the faint of spirit. And you've got to be intelligent - but your intellect must be tempered with equal doses of creativity and patience.

Think you qualify? Good. Not many do. But there is one more thing you need to bring with you. Curiosity. Overwhelming, insatiable curiosity. Because that's the fuel we'll use to power you on this journey.

If you're among the few to still be with us, congratulations. This is where your journey begins. The combined experiences of those who came before you are here, available for you to use whenever you're ready. All it takes is making the first step.

NEW

★ THE CSM NEWSLETTER COMPENDIUM / $29.95

From 1984 to 1986, the Golden Years of Commodore hacking, the CSM Newsletters were THE best source of inside information on the complex world of copy protection. This compendium provides you with the very best tips, tricks, hardware modifications and expert copy protection cracking techniques! If you're hungry for knowledge, this is a great source, and highly recomended by the Kracker Jax team.

★ THE CSM PROGRAM PROTECTION MANUAL VOL I / $24.95

The CSM books are the logical starting place to begin your higher education in copy protection. CSM, the original central clearing house of specialized info for hackers, put their best knowledge into these two books. Volume I provides an overview of copy protection issues and provides you with a foundation of information to begin building on.

★ THE CSM PROGRAM PROTECTION MANUAL VOL II / $29.95

Volume II begins where Volume I left off. It covers the evolution of copy protection schemes; autoboots; interrupts & resets; compilers; undocumented opcodes; encrypted programs; machine language; GCR data recording & reading; custom DOS routines like half-tracks, extras sectors, & modified formats; decryption & decoding techniques, and much more! This is a MUST READ for all serious Commodore users.

★ KRACKER JAX REVEALED: VOLUMES I, II, & III / $23.50 Per Volume

No serious hacker can be unfamiliar with the Kracker Jax name. The experts who created the award winning series of deprotection parameters were brought together to create a graduate course of inside information for the truly serious student of hacking. This is not an easy course - we strongly recommend that you don't even try the Revealed books until you study (or have experience equivalent to) the information in the CSM materials described above. But once you're ready, you'll find the Kracker Jax Revealed books to be the final step on the path to copy protection mastery.

KRACKER JAX REVEALED Book I

Uses 20 specific tutorials to introduce you to the unique concepts used by the Kracker Jax team. Includes a ML monitor, sector editor, error scanner, reset switch, & more.

KRACKER JAX REVEALED Book II

Gives you 20 more examples, and also reveals the secrets of the famous Rapidlok™ copy protection system! Includes the legendary HesMon™ machine language monitor cartridge at NO ADDITIONAL CHARGE!

KRACKER JAX REVEALED Book III

Is the final book in the Revealed series. Here, the student becomes the master as we show you how to create your own copy protection schemes, including one that can NOT be copied by any nibbler currently on the market! This book takes you deep inside the 1541 itself, where the new breed of ultra tough protection lives. Order now & get our famous $19.95 Hacker's Utility Kit software package FREE!

SOFTWARE SUPPORT INTERNATIONAL

Circle 17 on Reader Service card.

PLEASE READ BEFORE ORDERING: We accept money orders, certified checks, VISA, M/C and, Discover. Previous Software Support customers may use C.O.D. and personal checks. Orders shipped to U.S.A. (48 states). F.P.O., A.P.O., or possessions, please add $3.50 per order for S & H. U.S. shipping is by UPS ground in most cases. FAST 2nd DAY AIR available: add $1.00 per pound additional (U.S. 48 states only). Alaska or Hawaii (all orders shipped 2nd day air), please add $7.50 per order for S & H. C.O.D. available to U.S. customers only (50 states): add $2.75 along with your S & H charges per order. Canadian customers may calculate the S & H charges by including $4.00 (minimum charge) for the first two pieces of SOFTWARE and $1.00 for each additional piece per shipment. All monies must be submitted in U.S. funds. Canadians must call or write for hardware shipping charges. Foreign customers must call or write for shipping charges. Defective items are replaced at no charge if sent postpaid. All in stock orders are processed within 24 hours. U.S. SOFTWARE orders over $100 will be shipped 2nd Day Air at our regular $3.50 S & H charge (48 states only). Washington residents please add 7.6% additional for Sales Tax. All prices subject to change. All sales are final unless authorized by management.

Mail your order to: Software Support, Int.
2700 NE Andresen Road / Vancouver, WA 98661

Or call our toll-free order line at 1-800-356-1179. 6am-5pm Monday-Friday Pacific time
Technical support available. Call (206) 695-9648, 9am-5pm – Pacific time. Monday-Friday.
Orders Outside USA call (206) 695-1393.

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of the card, you can resize and reposition them anywhere you like. Remember that if you cover part of your picture with some of your text, you have the choice of using either Opaque or Transparent mode. Choose whichever looks better on your card.

Repeat the whole procedure for the inside of your card, using the top left quadrant, in which, remember, everything must be upside down. If you want to give yourself credit on the back of the card, you can simply select the text tool from the toolbox and create whatever you want for the back (bottom-left quadrant) of your card.

Figure 2 is an illustration of what my card looks like in the Preview mode. If you find that you need to make fine adjustments to your graphics, you can do it in Zoom mode.

Now the test! Print a copy of your card by selecting Print from the File menu. This first printout may not be properly aligned. To fix this, measure the distance from each border to the nearest edge of the paper. These measurements should all be equal. Ideally, there should be half an inch of space from each edge to a plain, thin-line border. If this doesn't turn out to be the case, readjust the paper in your printer and try again.

Once you get a perfect printout, exit to the deskTop and select the Master Page Library by clicking on its icon. Then select Info from the File menu and leave yourself a note in the remarks box, so you'll know how to set up your printer the next time you make a card.

The best way to fold your cards is to begin by folding the top half back so that you have the front of the card on one side of the paper and the inside on the other. Next, hold the card so that you're looking at the inside (the left half is blank). Now fold the left side over the right and you should be looking at the front. Make your folds as carefully as you can, so the corners come out even. You can trim the edges with scissors, but if you cut too much off, it will put the borders off center.

There are many different card designs in the world today. If you create a Master Page for each one you like, you'll have no trouble making unique greeting cards for any occasion. The use of colored paper or colored markers can also greatly help to brighten up your cards.

You could even print your Christmas cards on a laser printer and then have a professional printer run off copies for you. Then you can have colored ink and paper, or even real card stock! The possibilities are endless, and I hope you enjoy using geoPublish for making cards as much as I do. ■

Figure 1. The Master Page, with the card gridlines in place.

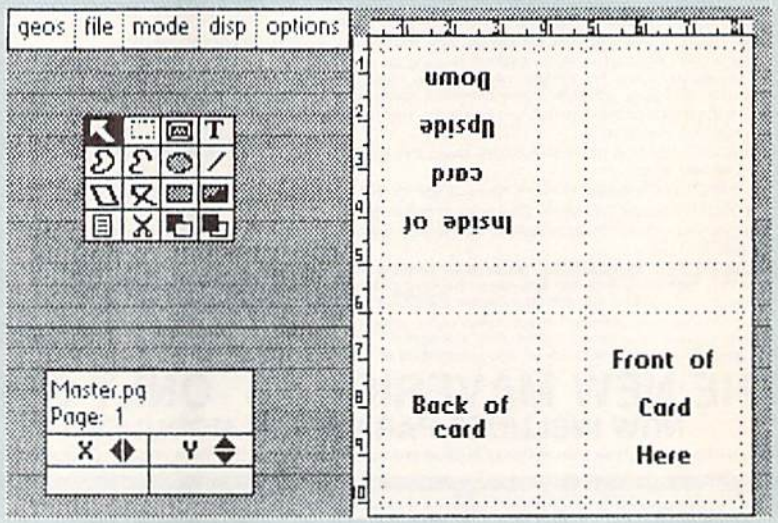
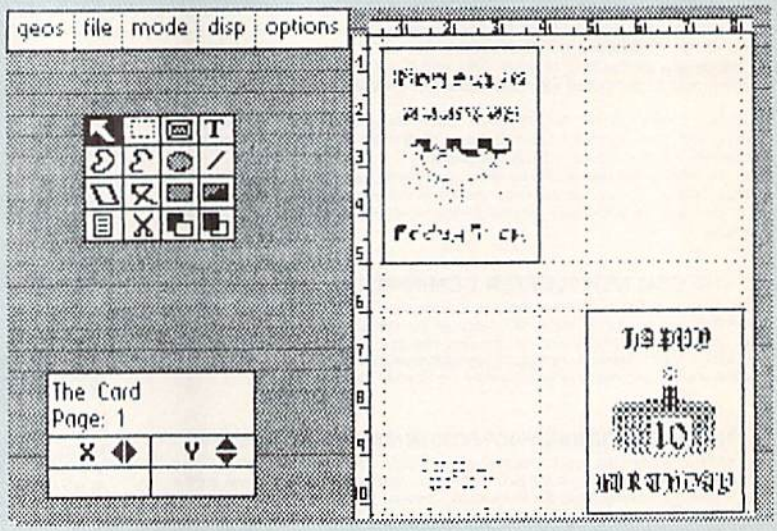


Figure 2. The card with graphics and text added.



Douglas Bayles, who works for the Navy as a contract field engineer, bought his first C-64 in 1983. He now has a 128 as well, and has become an enthusiastic GEOS user. In his spare time, he writes articles and technical reports and occasionally teaches evening adult classes in computer literacy and Basic programming.

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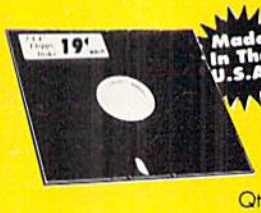

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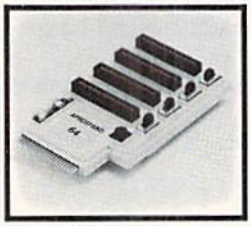

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RUN's Checksum

TYPE IN *RUN*'s CHECKSUM, which serves for both the C-64 and for the C-128 in either 40- or 80-Column mode, and save it to disk before running. When typing in a program from *RUN*, first load and run *RUN*'s Checksum. The screen will display a SYS number that deactivates and reactivates the Checksum. Always disable *RUN*'s Checksum before attempting to run another program. Note: You can abbreviate Basic keywords; spaces affect the checksum only when within quotes; and the order of characters affects the checksum.

With this new version, when you press return after typing in a program line, a one-, two-, or three-digit number from 0 to 255 appears in the home position. If this number matches the checksum value in the program listing, the line is correct. If the number that appears *doesn't* match the checksum value, compare the line with the magazine listing to find your error. Then move the cursor back up to the line and make your corrections. Now, after you press return, the correct checksum value should appear. Continue entering the listing until all the lines have been correctly typed. Then deactivate *RUN*'s Checksum, using the SYS number. Save the finished program.

All the graphics and control characters in the listings in *RUN* have been translated into understandable key combinations. They are the instructions you see inside the curly braces. For example, {SHIFT L} means you hold down the shift key while you press the L key. You do *not* type in the curly braces. What appears on the screen will look quite different from what is designated inside the braces. Here are some more examples:

{22 SPACEs}—press the space bar 22 times

{SHIFT CLR}—hold down the shift key and press the clr-home key

{2 CRSR DNs}—press the cursor-down key twice

{CTRL 1}—hold down the control key and press the 1 key

{COMD T}—hold down the Commodore logo key and press the T key

{FUNCT 1}—press the F1 key

{5 LB.s}—press the British pound key (*not* #) five times

Listing 1. *RUN*'s Checksum program. This program is available on *RUN*'s BBS for users to download.

```
10 REM RUN'S CHECKSUM 64/128 - BOB KODADEK
20 MO=128:SA=3328:IF PEEK(4096)THEN MO=64:SA=4
   9152
30 FOR I=0TO169:READB:CK=CK+B:POKE SA+I,B:NEXT
40 IFCK<>20651 THENPRINT"DATA ERROR!":END
50 POKESA+11,24:POKESA+111,38:POKESA+14,234
60 PRINTCHR$(147)STR$(MO)" RUN CHECKSUM":PRINT
70 PRINT"TO TOGGLE ON OR OFF, SYS"SA:IF MO=128
   THEN 100
80 POKESA+13,124:POKESA+15,165:POKESA+25,124:PO
   KESA+26,165
90 POKESA+39,20:POKESA+41,21:POKESA+123,205:POK
   ESA+124,189
100 POKESA+4,INT(SA/256):SYS SA:NEW
110 DATA 120,162,24,160,13,173,4,3,201,24,208,4
    ,162,13,160,67,142,4,3,140
120 DATA 5,3,88,96,32,13,67,152,72,169,0,141,0,
    255,133,176,133,180,166,22
130 DATA 164,23,134,167,132,168,170,189,0,2,240
    ,58,201,48,144,7,201,58,176
140 DATA 3,232,208,240,189,0,2,240,42,201,32,20
    8,4,164,180,240,31,201,34
150 DATA 208,6,165,180,73,1,133,180,230,176,164
    ,176,165,167,24,125,0,2,133
160 DATA 167,165,168,105,0,133,168,136,208,239,
    232,208,209,169,42,32,210
170 DATA 255,165,167,69,168,170,169,0,32,50,142
    ,169,32,32,210,255,32,210
180 DATA 255,169,13,32,210,255,104,168,96,104,1
    70,24,32,240,255,104,168
190 DATA 96,56,32,240,255,138,72,152,72,24,162,
    0,160,0,32,240,255,169
200 DATA 42,208,198
```

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From p. 10.

```
      RESS";EA                          :REM*117
6ØØ2Ø INPUT"START AT WHAT LINE";L:INPUT"LI
      NE INCREMENT";LI                  :REM*65
6ØØ3Ø IFLI<1ORA>EAORL<ØTHENPRINT"???ERROR"
      :END                              :REM*93
6ØØ4Ø PRINT"{SHFT CLR}"L"DATA";:X=Ø
                                        :REM*168
6ØØ45 A$=STR$(PEEK(A)):A$=RIGHT$(A$,LEN(A$
      )-1)                              :REM*57
6ØØ5Ø PRINTA$;:A=A+1:IFA=EATHENPOKE251,1:G
      OTO6ØØ8Ø                          :REM*129
6ØØ6Ø X=X+1:IFX<8THENPRINT",";:GOTO6ØØ45
                                        :REM*2ØØ
6ØØ7Ø POKE251,Ø                         :REM*239
6ØØ8Ø PRINT:PRINT"A="A":EA="EA":L="L":LI="
      LI":GOTO6Ø1ØØ"                    :REM*12
6ØØ9Ø POKE198,4:POKE631,19:POKE632,13:POKE
      633,13:STOP                       :REM*26
6Ø1ØØ IFPEEK(251)THENPRINT"{SHFT CLR}DONE.
      .":LIST                           :REM*246
6Ø11Ø L=L+LI:GOTO6ØØ4Ø                  :REM*211
```

—David M. Ficken, Topsail, Nfld., Canada

$56A Porting Basic 7.0 to GWBasic

I like to port Basic 7.0 programs from my C-128 over to GWBasic, the version of MS-DOS Basic used on PC-compatible computers. The initial process requires five Direct Mode commands on the C-128, as follows:

```
DLOAD "filename"
DOPEN#4,"newfilename",D0,U8,W
CMD4
LIST
PRINT#4:DCLOSE
```

In the above example, "filename" is the C-128 program to be converted. It is written back to disk as a sequential file, which you can then convert to an MS-DOS disk format by using *RUN*'s Commodore-to-MS-DOS conversion program (April 1989).

Once it's in MS-DOS format, it can be loaded into GWBasic and certain keywords can be converted. For example, you have to change "PRINT#4," to the GWBasic keyword LPrint. This entire process is many times faster than typing a Basic 7.0 program into your MS-DOS computer and making all the keyword conversions.

—Nick J. Piazza, Sylvania, OH ■

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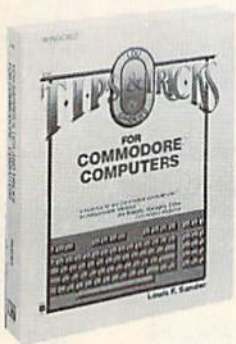

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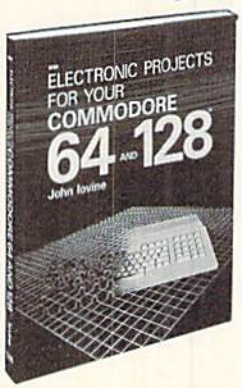

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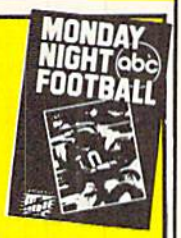

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GRAPHMAKER

From p. 50.

```
   SHFT R}{SHFT A}{SHFT P}{SHFT
    H}{SHFT M}{SHFT A}{SHFT K}{
   SHFT E}{SHFT R}{SHFT SPACE}6
   4/128 ****"            :REM*195
9Ø REM "****{2 SPACEs}BY {SHFT
   R}OBIN {SHFT F}RANZEL{2 SPAC
   Es}****"               :REM*211
1ØØ REM "****{5 SPACEs}{SHFT J}
   UNE, 1988{5 SPACEs}****"
                          :REM*97
11Ø REM "********************
   ******"                :REM*122
12Ø GOTO64Ø               :REM*2Ø3
13Ø REM **** COMPUTE TABS ****
                          :REM*77
14Ø TA=ABS(INT((CO-ML)/2)):RETU
   RN                     :REM*52
15Ø REM **** SPECIAL MESSAGES *
   ***                    :REM*255
16Ø ML=1Ø:GOSUB14Ø:PRINT"{SHFT
   CLR}{CRSR DN}"SPC(TA)"{CTRL
    9}{SHFT E}DIT {SHFT G}RAPH
   {2 CRSR DNs}":RETURN:REM*2Ø
17Ø ML=12:GOSUB14Ø:PRINT"{SHFT
   CLR}{CRSR DN}"SPC(TA)"{CTRL
    9}{SHFT C}REATE {SHFT G}RA
   PH{2 CRSR DNs}":RETURN
                          :REM*13Ø
18Ø ML=1Ø:GOSUB14Ø:PRINT"{SHFT
   CLR}{CRSR DN}"SPC(TA)"{CTRL
    9}{SHFT S}{SHFT A}{SHFT V}
   {SHFT E} {SHFT G}{SHFT R}{S
   HFT A}{SHFT P}{SHFT H}{2 CR
   SR DNs}":RETURN        :REM*23
19Ø ML=1Ø:GOSUB14Ø:PRINT"{SHFT
   CLR}{CRSR DN}"SPC(TA)"{CTRL
    9}{SHFT L}{SHFT O}{SHFT A}
   {SHFT D} {SHFT G}{SHFT R}{S
   HFT A}{SHFT P}{SHFT H}{2 CR
   SR DNs}":RETURN        :REM*151
2ØØ ML=18:GOSUB14Ø:PRINT"{SHFT
   CLR}"LEFT$(CL$,12)SPC(TA)"{
   SHFT N}O {SHFT G}RAPH IN {S
   HFT M}EMORY"           :REM*221
21Ø FORI=1TO15ØØ:NEXT:RETURN
                          :REM*155
22Ø ML=28:GOSUB14Ø:PRINT"{SHFT
   CLR}"LEFT$(CL$,12)SPC(TA)"{
   SHFT E}RASE {SHFT G}RAPH IN
    {SHFT M}EMORY? (Y/N)"
                          :REM*127
23Ø REM **** WAIT FOR Y/N ****
                          :REM*193
24Ø GETA$:IFA$<>"Y"THENIFA$<>"N
   "THEN24Ø               :REM*8
25Ø RETURN                :REM*137
26Ø ML=25:GOSUB14Ø:PRINTCL$SPC(
   TA)"PRESS ANY KEY TO CONTIN
   UE";                   :REM*49
27Ø GETA$:IFA$=""THEN27Ø
                          :REM*219
28Ø REM **** DISPLAY LOWERCASE
   ****                   :REM*87
29Ø FORI=1TOLEN(A$):PRINTCHR$(A
   SC(MID$(A$,I,1))AND127);:NE
   XT                     :REM*232
3ØØ RETURN                :REM*187
31Ø REM **** DECLARE VARIABLES
   ****                   :REM*79
32Ø CLOSE1:OPEN1,Ø        :REM*177
33Ø MO=128:M=PEEK(215):IFM=128T
   HEN37Ø                 :REM*39
34Ø IFM<>ØTHENMO=64       :REM*7Ø
35Ø CO=4Ø:RA=6            :REM*1
36Ø GOTO38Ø               :REM*188
37Ø CO=8Ø:RA=12           :REM*59
38Ø DIMRV(12),RV$(15),RN$(12),S
   V(12),RA(12,2)         :REM*65
39Ø TT$="":LE$="":RN=Ø:G=Ø:PW=4
   Ø                      :REM*16
4ØØ CL$="{HOME}{24 CRSR DNs}"
                          :REM*125
41Ø RETURN                :REM*42
42Ø REM **** OPEN FILES ****
                          :REM*148
43Ø CLOSE4:CLOSE5:OPEN4,4,S1:OP
   EN5,4,S2               :REM*1Ø4
44Ø RETURN                :REM*68
45Ø CLOSE15:OPEN15,8,15,"IØ":RE
   TURN                   :REM*2Ø2
46Ø INPUT#15,N1,N2$,N3,N4:IFN1<
   2ØTHENRETURN           :REM*14Ø
47Ø ML=1Ø:GOSUB14Ø:PRINT"{SHFT
   CLR}"LEFT$(CL$,12)SPC(TA)"{
   CTRL 9}{SHFT D}{SHFT I}{SHF
   T S}{SHFT K}{SHFT SPACE}{SH
   FT E}{2 SHFT Rs}{SHFT O}{SH
   FT R}{CRSR DN}"        :REM*53
48Ø ML=25:GOSUB14Ø:PRINTSPC(TA)
   N1;N2$;N3;N4           :REM*148
49Ø GOSUB26Ø:RETURN       :REM*187
5ØØ REM **** CREATE LABEL/SYMBO
   LIC ****               :REM*24Ø
51Ø MA=RV(1):MI=MA:IFRN=1THEN57
   Ø                      :REM*65
52Ø FORI=2TORN            :REM*54
53Ø IFRV(I)=ØTHEN56Ø      :REM*61
54Ø IFRV(I)>MATHENMA=RV(I)
                          :REM*19Ø
55Ø IFRV(I)<MITHENMI=RV(I)
                          :REM*127
56Ø NEXT                  :REM*176
57Ø IFMA=MITHENMI=MA-14:IFMI<ØT
   HENMI=1:MA=15          :REM*8
58Ø RA=MA-MI:NC=INT(RA/14):IFNC
   <>RA/14THENNC=NC+1     :REM*197
59Ø RV$(1)=STR$(MI):FORI=2TO15
                          :REM*136
6ØØ RV$(I)=STR$(VAL(RV$(I-1))+N
   C):NEXT                :REM*1Ø8
61Ø FORI=1TORN:SV(I)=INT(((RV(I
   )-MI)/NC)+1.5):NEXT:REM*159
62Ø RETURN                :REM*248
63Ø REM **** START PROGRAM ****
                          :REM*142
64Ø POKE53281,12:POKE5328Ø,11
                          :REM*91
65Ø PRINTCHR$(14)CHR$(8):GOSUB3
   2Ø                     :REM*68
66Ø ML=18:GOSUB14Ø:PRINT"{CTRL
   2}{SHFT CLR}{7 CRSR DNs}"SP
   C(TA)"{SHFT G}{SHFT R}{SHFT
    A}{SHFT P}{SHFT H}{SHFT M}
   {SHFT A}{SHFT K}{SHFT E}{SH
   FT R}{SHFT SPACE}64/128"
                          :REM*156
67Ø ML=2:GOSUB14Ø:PRINT:PRINTSP
   C(TA)"BY"              :REM*213
68Ø ML=14:GOSUB14Ø:PRINT:PRINTS
   PC(TA)"{SHFT R}OBIN {SHFT F
   }RANZEL"               :REM*44
69Ø ML=32:GOSUB14Ø:PRINT"{12 CR
   SR DNs}"SPC(TA)"{SHFT R}UNN
   ING IN {SHFT C}-"; :REM*185
7ØØ PRINTRIGHT$(STR$(MO),LEN(ST
   R$(MO))-1);" - ";      :REM*84
71Ø PRINTRIGHT$(STR$(CO),2);" {
   SHFT C}OLUMN {SHFT M}ODE";
                          :REM*1Ø7
72Ø FORI=1TO175Ø:NEXT     :REM*221
73Ø REM **** MAIN MENU ****
                          :REM*72
74Ø ML=17:GOSUB14Ø:PRINT"{SHFT
   CLR}{CRSR DN}"SPC(TA)"{CTRL
    9}{SHFT G}{SHFT R}{SHFT A}
   {SHFT P}{SHFT H}{SHFT M}{SH
   FT A}{SHFT K}{SHFT E}{SHFT
   R} 64/128"             :REM*122
75Ø ML=9:GOSUB14Ø:PRINT"{2 CRSR
    DNs}"SPC(TA)"{SHFT M}{SHFT
    A}{SHFT I}{SHFT N}{SHFT SP
   ACE}{SHFT M}{SHFT E}{SHFT N
   }{SHFT U}"             :REM*19
76Ø ML=18:GOSUB14Ø:PRINT"{2 CRS
   R DNs}";               :REM*187
77Ø PRINTSPC(TA)"1.{2 SPACEs}{S
   HFT C}REATE {SHFT G}RAPH":P
   RINT                   :REM*2Ø3
78Ø PRINTSPC(TA)"2.{2 SPACEs}{S
   HFT V}IEW {SHFT G}RAPH":PRI
   NT                     :REM*94
79Ø PRINTSPC(TA)"3.{2 SPACEs}{S
   HFT E}DIT {SHFT G}RAPH":PRI
   NT                     :REM*125
8ØØ PRINTSPC(TA)"4.{2 SPACEs}{S
   HFT S}AVE {SHFT G}RAPH":PRI
   NT                     :REM*223
81Ø PRINTSPC(TA)"5.{2 SPACEs}{S
   HFT L}OAD {SHFT G}RAPH":PRI
   NT                     :REM*139
82Ø PRINTSPC(TA)"6.{2 SPACEs}{S
   HFT P}RINT {SHFT G}RAPH":PR
   INT                    :REM*125
83Ø PRINTSPC(TA)"7.{2 SPACEs}{S
   HFT P}RINTER {SHFT S}ETUP":
   PRINT                  :REM*249
84Ø PRINTSPC(TA)"8.{2 SPACEs}{S
   HFT E}ND {SHFT P}ROGRAM"
                          :REM*42
85Ø ML=28:GOSUB14Ø:PRINTCL$SPC(
   TA)"{SHFT E}NTER {SHFT S}EL
   ECTION (1-8){3 SPACEs}";
                          :REM*116
86Ø IFMO=64THENPOKE198,Ø
                          :REM*19Ø
87Ø IFMO=128THENPOKE2Ø8,Ø
                          :REM*2Ø9
88Ø IFGTHENINPUT"{3 SPACEs}2{3
   CRSR LFs}";A$:GOTO9ØØ:REM*3
89Ø INPUT"{3 SPACEs}1{3 CRSR LF
   s}";A$                 :REM*64
9ØØ ONVAL(A$)GOTO98Ø,139Ø,122Ø,
   238Ø,257Ø,177Ø,277Ø,92Ø:GOT
   O74Ø                   :REM*97
91Ø REM **** END PROGRAM ****
                          :REM*141
92Ø IFG=ØTHENGOTO95Ø      :REM*245
```

```
93Ø ML=2Ø:GOSUB14Ø:PRINT"{SHFT
    CLR}"LEFT$(CL$,12)SPC(TA)"{
    SHFT A}RE YOU SURE?{2 SPACE
    s}(Y/N)"          :REM*1Ø8
94Ø GOSUB24Ø:IFA$<>"Y"THEN74Ø
                      :REM*148
95Ø ML=13:GOSUB14Ø:PRINT"{SHFT
    CLR}"LEFT$(CL$,12)SPC(TA)"{
    SHFT P}ROGRAM ENDED"
                      :REM*23Ø
96Ø PRINTCHR$(9):END  :REM*224
97Ø REM **** CREATE GRAPH ****
                      :REM*176
98Ø IFG=ØTHEN1Ø1Ø     :REM*164
99Ø GOSUB22Ø:IFA$="N"THEN74Ø
                      :REM*17Ø
1ØØØ CLR:GOSUB32Ø     :REM*14Ø
1Ø1Ø GOSUB17Ø         :REM*64
1Ø2Ø ML=16:GOSUB14Ø:PRINTSPC(TA
    )"{SHFT P}RESS {LEFT ARROW
    } FOR {SHFT M}{SHFT E}{SHF
    T N}{SHFT U}{CRSR DN}"
                      :REM*118
1Ø3Ø PRINT"{SHFT E}NTER {SHFT T
    }ITLE:{2 SPACEs}{CTRL 9}";
    :INPUT#1,TT$:PRINT:REM*113
1Ø4Ø IFTT$="{LEFT ARROW}"THEN:C
    LR:GOSUB32Ø:GOTO74Ø
                      :REM*246
1Ø5Ø PRINT"{SHFT E}NTER {SHFT L
    }EGEND:{2 SPACEs}{CTRL 9}"
    ;:INPUT#1,LE$:PRINT:REM*62
1Ø6Ø IFLE$="{LEFT ARROW}"THEN:C
    LR:GOSUB32Ø:GOTO74Ø
                      :REM*223
1Ø7Ø PRINT"{SHFT N}UMBER OF {SH
    FT R}ANGES (1-12):{8 SPACE
    s}{6 CRSR LFs}";:INPUT#1,R
    N$:RN=VAL(RN$)    :REM*141
1Ø8Ø IFRN>ØANDRN<13THEN11ØØ
                      :REM*5Ø
1Ø9Ø PRINT:PRINT"{CRSR UP}";:GO
    TO1Ø7Ø            :REM*99
11ØØ PRINT"{CRSR DN}":PRINT"{SH
    FT K}EYBOARD OR {SHFT D}IS
    K {SHFT I}NPUT? (K/D){6 SP
    ACEs}{4 CRSR LFs}";:INPUT#
    1,A$:PRINT        :REM*139
111Ø IFA$<>"K"ANDA$<>"D"THENPRI
    NT:PRINT"{2 CRSR UPs}";:GO
    TO11ØØ            :REM*61
112Ø IFA$="D"THEN295Ø :REM*149
113Ø PRINT            :REM*6
114Ø FORI=1TORN:PRINT"{SHFT L}A
    BEL FOR {SHFT R}ANGE"I"{CR
    SR LF}:{2 SPACEs}{CTRL 9}"
    ::INPUT#1,RN$(I):PRINT:NEX
    T                 :REM*168
115Ø GOSUB17Ø         :REM*212
116Ø FORI=1TORN       :REM*184
117Ø PRINT"{SHFT E}NTER {SHFT M
    }AX {SHFT V}ALUE FOR {SHFT
     R}ANGE"I"{CRSR LF}:{2 SPA
    CEs}";:INPUT#1,RV$:REM*152
118Ø RV(I)=VAL(RV$):PRINT:NEXT
                      :REM*1Ø9
119Ø GOSUB51Ø         :REM*246
12ØØ G=1:GOTO74Ø      :REM*183
121Ø REM **** EDIT GRAPH ****
                      :REM*91
122Ø IFG=ØTHENGOSUB2ØØ:GOTO74Ø
                      :REM*242
123Ø GOSUB16Ø         :REM*24
124Ø PRINT"{SHFT T}ITLE:{2 SPAC
    Es}{CTRL 9}"TT$;:FORI=1TOL
    EN(TT$):PRINT"{CRSR LF}";:
    NEXT:INPUT#1,TT$:PRINT
                      :REM*234
125Ø PRINT"{SHFT L}EGEND:{2 SPA
    CEs}{CTRL 9}"LE$;:FORI=1TO
    LEN(LE$):PRINT"{CRSR LF}";
    :NEXT:INPUT#1,LE$:PRINT
                      :REM*32
126Ø PRINT"{SHFT N}UMBER OF {SH
    FT R}ANGES (1-12):{2 SPACE
    s}{CTRL 9}"RIGHT$(STR$(RN)
    ,LEN(STR$(RN))-1);:REM*163
127Ø FORI=1TOLEN(STR$(RN))-1:PR
    INT"{CRSR LF}";:NEXT:INPUT
    #1,RN$:RN=VAL(RN$):REM*211
128Ø IFRN>ØANDRN<13THEN13ØØ
                      :REM*214
129Ø PRINT:PRINT"{CRSR UP}";:GO
    TO126Ø            :REM*76
13ØØ PRINT:PRINT      :REM*235
131Ø FORI=1TORN:PRINT"{SHFT L}A
    BEL FOR {SHFT R}ANGE"I"{CR
    SR LF}:{2 SPACEs}{CTRL 9}"
    ;RN$(I);          :REM*187
132Ø FORK=1TOLEN(RN$(I)):PRINT"
    {CRSR LF}";:NEXT:INPUT#1,R
    N$(I):PRINT:NEXT  :REM*244
133Ø GOSUB16Ø         :REM*132
134Ø FORI=1TORN:PRINT"{SHFT M}A
    X {SHFT V}ALUE FOR {SHFT R
    }ANGE"I"{CRSR LF}:{2 SPACE
    s}"STR$(RV(I));   :REM*1Ø5
135Ø FORK=1TOLEN(STR$(RV(I)))-1
    :PRINT"{CRSR LF}";:NEXT:IN
    PUT#1,RV$         :REM*29
136Ø RV(I)=VAL(RV$):PRINT:NEXT
                      :REM*38
137Ø GOSUB51Ø:GOTO74Ø :REM*221
138Ø REM **** VIEW GRAPH ****
                      :REM*136
139Ø IFG=ØTHENGOSUB2ØØ:GOTO74Ø
                      :REM*95
14ØØ PRINT"{SHFT CLR}"CHR$(142)
                      :REM*175
141Ø ML=1Ø:GOSUB14Ø:PRINT"{SHFT
     CLR}"SPC(TA)"{CTRL 9}VIEW
     GRAPH{CRSR DN}"  :REM*2Ø7
142Ø UB=RN            :REM*66
143Ø IFCO=8ØTHENSP=INT(6Ø/UB)-3
    :GOTO146Ø         :REM*168
144Ø IFCO=4ØTHENIFRN>6THENUB=6
                      :REM*124
145Ø SP=INT(3Ø/UB)-3  :REM*14
146Ø ML=LEN(TT$):GOSUB14Ø:A$=TT
    $                 :REM*16
147Ø PRINTSPC(TA);:GOSUB29Ø:PRI
    NT:PRINT          :REM*82
148Ø FORI=15TO2STEP-1 :REM*52
149Ø PRINTRIGHT$("{5 SPACEs}"+R
    IGHT$(RV$(I),LEN(RV$(I))-1
    ),5)"{COMD Q}";   :REM*1Ø2
15ØØ IFI/3=INT(I/3)THENPRINT"{2
     SHFT *s}";:GOTO152Ø:REM*4
```

►

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Circle 65 on Reader Service card.

```
151Ø PRINT"{2 SPACEs}";:REM*166
152Ø FORK=1TOUB:IFI>SV(K)ANDI/3
     =INT(I/3)THENPRINT"{3 SHFT
      *s}";:GOTO157Ø    :REM*141
153Ø IFI>SV(K)THENPRINT"{3 SPAC
     Es}";:GOTO157Ø     :REM*1Ø6
154Ø IFI=SV(K)THENPRINT"{CTRL 9
     }"CHR$(169)CHR$(32)CHR$(11
     Ø)"{CTRL Ø}";:GOTO157Ø
                        :REM*83
155Ø IFSV(K)=I+1THENPRINT"{CTRL
      9}"CHR$(183)CHR$(112)" {C
     TRL Ø}";:GOTO157Ø  :REM*15
156Ø PRINT"{CTRL 9} "CHR$(167)"
      {CTRL Ø}";        :REM*118
157Ø IFI/3=INT(I/3)THENFORS=1TO
     SP:PRINT"{SHFT *}";:NEXT:G
     OTO159Ø            :REM*24Ø
158Ø FORS=1TOSP:PRINT" ";:NEXT
                        :REM*227
159Ø NEXT:PRINT"{COMD W}":NEXT
                        :REM*99
16ØØ PRINTRIGHT$("{5 SPACEs}"+R
     IGHT$(RV$(1),LEN(RV$(1))-1
     ),5)"{COMD Q}";    :REM*36
161Ø PRINT"{2 SPACEs}"; :REM*25
162Ø FORK=1TOUB:IFSV(K)<1THENPR
     INT"{3 SPACEs}";:GOTO166Ø
                        :REM*27
163Ø IFSV(K)=1THENPRINT"{CTRL 9
     }"CHR$(169)CHR$(32)CHR$(11
     Ø)"{CTRL Ø}";:GOTO166Ø
                        :REM*216
164Ø IFSV(K)=2THENPRINT"{CTRL 9
     }"CHR$(183)CHR$(112)"{CTRL
      Ø}"CHR$(169);:GOTO166Ø
                        :REM*7Ø
165Ø PRINT"{CTRL 9} "CHR$(167)"
     {CTRL Ø}"CHR$(169);:REM*96
166Ø FORS=1TOSP:PRINT" ";:NEXT
                        :REM*5Ø
167Ø NEXT:PRINT"{COMD W}"
                        :REM*2Ø
168Ø PRINT"{4 SPACEs}Ø{3 COMD E
     s}";               :REM*195
169Ø FORI=1TOUB:PRINT"{3 COMD E
     s}";:FORS=1TOSP:PRINT"{COM
     D E}";:NEXT:NEXT:PRINT"{CO
     MD E}"             :REM*137
17ØØ PRINT"{7 SPACEs}";:FORI=1T
     OUB                :REM*98
171Ø PRINTLEFT$(RN$(I)+"{19 SPA
     CEs}",SP+2);" ";:NEXT
                        :REM*219
172Ø PRINT:PRINT        :REM*153
173Ø ML=LEN(LE$):GOSUB14Ø:PRINT
     SPC(TA);:A$=LE$:GOSUB29Ø
                        :REM*199
174Ø GOSUB26Ø           :REM*22
175Ø PRINT"{SHFT CLR}";CHR$(14)
     :GOTO74Ø           :REM*23
176Ø REM **** PRINT GRAPH ****
                        :REM*89
177Ø IFG=ØTHENGOSUB2ØØ:GOTO74Ø
                        :REM*21Ø
178Ø ML=11:GOSUB14Ø:PRINT"{SHFT
      CLR}"SPC(TA)"{CTRL 9}{SHF
     T P}{SHFT R}{SHFT I}{SHFT
     N}{SHFT T}{SHFT SPACE}{SHF
     T G}{SHFT R}{SHFT A}{SHFT
     P}{SHFT H}{2 CRSR DNs}"
                        :REM*243
179Ø PRINT"{SHFT T}ITLE:{2 SPAC
     Es}"TT$:PRINT      :REM*191
18ØØ PRINT"{SHFT L}EGEND: "LE$:
     PRINT              :REM*114
181Ø PRINT"{SHFT R}ANGE {SHFT N
     }AME","{SHFT M}AX {SHFT V}
     ALUE{CRSR DN}"     :REM*28
182Ø FORI=1TORN:PRINT" "RN$(I),
     ,RV(I):NEXT        :REM*3
183Ø IFMO=128 THEN BANKØ
                        :REM*236
184Ø S1=PEEK(4Ø577):S2=PEEK(4Ø5
     78):TP=CO:CO=4Ø:IFRN>6THEN
     CO=8Ø              :REM*158
185Ø GOSUB43Ø           :REM*129
186Ø I=PEEK(4Ø579):IFI=ØTHEN188
     Ø                  :REM*2Ø2
187Ø FORK=1TOI:P=PEEK(4Ø579+K):
     PRINT#4,CHR$(P);:NEXT:PRIN
     T#4                :REM*221
188Ø ML=LEN(TT$):GOSUB14Ø
                        :REM*251
189Ø PRINT#4,SPC(TA)TT$:PRINT#4
     :PRINT#4:PRINT#4   :REM*251
19ØØ SP=INT(3Ø/RN)-3:IFCO=8ØTHE
     NSP=INT(6Ø/RN)-3   :REM*136
191Ø IFPEEK(4Ø576)<>ØTHEN223Ø
                        :REM*2Ø5
192Ø FORI=15TO2STEP-1   :REM*255
193Ø IFI/2=INT(I/2)THENPRINT#5,
     "{5 SPACEs}{COMD Q}";:GOTO
     195Ø               :REM*193
194Ø PRINT#5,RIGHT$("{5 SPACEs}
     "+RIGHT$(RV$(I),LEN(RV$(I)
     )-1),5)"{COMD Q}"; :REM*36
195Ø IFI/3=INT(I/3)THENPRINT#5,
     "{2 SHFT *s}";:GOTO197Ø
                        :REM*247
196Ø PRINT#5,"{2 SPACEs}";
                        :REM*2Ø9
197Ø FORK=1TORN:IFI>SV(K)ANDI/3
     =INT(I/3)THENPRINT#5,"{3 S
     HFT *s}";:GOTO2Ø3Ø:REM*224
198Ø IFI>SV(K)THENPRINT#5,"{3 S
     PACEs}";:GOTO2Ø3Ø   :REM*52
199Ø IFI=SV(K)THENPRINT#5,"{CTR
     L 9}"CHR$(169)CHR$(32)CHR$
     (11Ø)"{CTRL Ø}";:GOTO2Ø3Ø
                        :REM*222
2ØØØ IFSV(K)=I+1THENPRINT#5,"{C
     TRL 9}"CHR$(183)CHR$(112)"
      {CTRL Ø}";:GOTO2Ø3Ø
                        :REM*17Ø
2Ø1Ø IFSV(K)=2THENPRINT"{CTRL 9
     }"CHR$(183)CHR$(112)CHR$(1
     69)"{CTRL Ø}";:GOTO2Ø3Ø
                        :REM*84
2Ø2Ø PRINT#5,"{CTRL 9} "CHR$(16
     7)" {CTRL Ø}";     :REM*236
2Ø3Ø IFI/3=INT(I/3)THENFORS=1TO
     SP:PRINT#5,"{SHFT *}";:NEX
     T:GOTO2Ø5Ø         :REM*17Ø
2Ø4Ø FORS=1TOSP:PRINT#5," ";:NE
     XT                 :REM*11
2Ø5Ø NEXT:PRINT#5,"{COMD W}":NE
     XT                 :REM*85
2Ø6Ø PRINT#5,RIGHT$("{5 SPACEs}
     "+RIGHT$(RV$(1),LEN(RV$(1)
     )-1),5)"{COMD Q}"; :REM*72
2Ø7Ø PRINT#5,"{2 SPACEs}";
                        :REM*68
2Ø8Ø FORK=1TORN:IFSV(K)<1THENPR
     INT#5,"{3 SPACEs}";:GOTO21
     2Ø                 :REM*116
2Ø9Ø IFSV(K)=1THENPRINT#5,"{CTR
     L 9}"CHR$(169)CHR$(32)CHR$
     (11Ø)"{CTRL Ø}";:GOTO212Ø
                        :REM*68
21ØØ IFSV(K)=2THENPRINT#5,"{CTR
     L 9}"CHR$(183)CHR$(112)"{C
     TRL Ø}"CHR$(169);:GOTO212Ø
                        :REM*151
211Ø PRINT#5,"{CTRL 9} "CHR$(16
     7)"{CTRL Ø}"CHR$(169);
                        :REM*139
212Ø FORS=1TOSP:PRINT#5," ";:NE
     XT                 :REM*187
213Ø NEXT:PRINT#5,"{COMD W}"
                        :REM*146
214Ø PRINT#5,"{4 SPACEs}Ø{3 COM
     D Es}";            :REM*52
215Ø FORI=1TORN:PRINT#5,"{3 COM
     D Es}";:FORS=1TOSP:PRINT#5
     ,"{COMD E}";:NEXT:NEXT:PRI
     NT#5,"{COMD E}"    :REM*23
216Ø PRINT#5,"{7 SPACEs}";:FORI
     =1TORN             :REM*211
217Ø PRINT#5,LEFT$(RN$(I)+"{19
     SPACEs}",SP+2);" ";:NEXT
                        :REM*42
218Ø PRINT#5:PRINT#5:PRINT#5
                        :REM*221
219Ø ML=LEN(LE$):GOSUB14Ø:PRINT
     #4,SPC(TA)LE$:PRINT#4:PRIN
     T#4                :REM*9Ø
22ØØ IFMO=128 THEN BANK15
                        :REM*2Ø7
221Ø CO=TP:CLOSE4:CLOSE5:REM*7Ø
222Ø PRINT"{SHFT CLR}":GOTO74Ø
                        :REM*231
223Ø FORI=15TO1STEP-1   :REM*48
224Ø IFI/2=INT(I/2)THENPRINT#5,
     "{5 SPACEs}!";:GOTO226Ø
                        :REM*1Ø4
225Ø PRINT#5,RIGHT$("{5 SPACEs}
     "+RIGHT$(RV$(I),LEN(RV$(I)
     )-1),5)"!";        :REM*4Ø
226Ø IFI/3=INT(I/3)THENPRINT#5,
     "--";:GOTO228Ø     :REM*69
227Ø PRINT#5,"{2 SPACEs}";
                        :REM*29
228Ø FORK=1TORN:IFI>SV(K)ANDI/3
     =INT(I/3)THENPRINT#5,"--"
     ;:GOTO231Ø         :REM*1ØØ
229Ø IFI>SV(K)THENPRINT#5,"{3 S
     PACEs}";:GOTO231Ø  :REM*255
23ØØ IFI<=SV(K)THENPRINT#5,":::
     ";                 :REM*249
231Ø IFI/3=INT(I/3)THENFORS=1TO
     SP:PRINT#5,"-";:NEXT:GOTO2
     33Ø                :REM*147
232Ø FORS=1TOSP:PRINT#5," ";:NE
     XT                 :REM*1ØØ
233Ø NEXT:PRINT#5,"!":NEXT
                        :REM*126
```

```
234Ø PRINT#5,"{4 SPACEs}Ø...";
                          :REM*31
235Ø FORI=1TORN:PRINT#5,"...";:
     FORS=1TOSP:PRINT#5,".";:NE
     XT:NEXT:PRINT#5,"!"
                          :REM*151
236Ø PRINT#5:GOTO216Ø     :REM*52
237Ø REM **** SAVE GRAPH ****
                          :REM*46
238Ø IFG=ØTHENGOSUB2ØØ:GOTO74Ø
                          :REM*113
239Ø GOSUB18Ø             :REM*166
24ØØ ML=24:GOSUB14Ø:PRINTSPC(TA
     )"{SHFT E}NTER {SHFT F}ILE
     NAME FOR {SHFT S}{SHFT A}{
     SHFT V}{SHFT E},{CRSR DN}"
                          :REM*171
241Ø ML=13:GOSUB14Ø:PRINTSPC(TA
     )"{SHFT O}R {CTRL 9}{LEFT
     ARROW}{CTRL Ø} FOR MENU{2
     CRSR DNs}"           :REM*127
242Ø ML=16:GOSUB14Ø:PRINTSPC(TA
     );:INPUT#1,FI$       :REM*175
243Ø IFFI$="{LEFT ARROW}"THEN74
     Ø                    :REM*8Ø
244Ø IFLEN(FI$)>16THENFI$=LEFT$
     (FI$,16)             :REM*44
245Ø GOSUB18Ø             :REM*226
246Ø ML=28:GOSUB14Ø:PRINTLEFT$(
     CL$,12)SPC(TA)"{SHFT S}AVI
     NG {SHFT G}RAPH "FI$
                          :REM*244
247Ø GOSUB45Ø:OPEN2,8,2,"Ø:"+FI
     $+",S,W":GOSUB46Ø:IFN1>2ØT
     HENCLOSE2:GOTO74Ø :REM*136
2475 IF MO=128 THEN BANKØ
                          :REM*9Ø
248Ø FORI=ØTO3:TP=PEEK(4Ø576+I)
     :PRINT#2,TPCHR$(13);:NEXT
                          :REM*38
249Ø IFTP>ØTHENK=TP:FORI=1TOK:T
     P=PEEK(4Ø579+I):PRINT#2,TP
     CHR$(13);:NEXT       :REM*1Ø3
2495 IF MO=128 THEN BANK15
                          :REM*54
25ØØ IFTT$=""THENTT$="."
                          :REM*1Ø2
251Ø IFLE$=""THENLE$=".":REM*22
252Ø PRINT#2,TT$CHR$(13);:PRINT
     #2,LE$CHR$(13);:PRINT#2,RN
     CHR$(13);            :REM*197
253Ø FORI=1TORN:IFRN$(I)=""THEN
     RN$(I)="."           :REM*248
254Ø PRINT#2,RV(I)CHR$(13);:PRI
     NT#2,RN$(I)CHR$(13);:NEXT
                          :REM*2ØØ
255Ø CLOSE2:CLOSE15:GOTO74Ø
                          :REM*92
256Ø REM **** LOAD GRAPH ****
                          :REM*85
257Ø IFG<>ØTHENGOSUB22Ø:IFA$<>"
     Y"THEN74Ø            :REM*123
258Ø CLR:GOSUB32Ø         :REM*19Ø
259Ø GOSUB19Ø             :REM*116
26ØØ ML=24:GOSUB14Ø:PRINTSPC(TA
     )"{SHFT E}NTER {SHFT F}ILE
     NAME FOR {SHFT L}{SHFT O}{
     SHFT A}{SHFT D},{CRSR DN}"
                          :REM*46
261Ø ML=13:GOSUB14Ø:PRINTSPC(TA
     )"{SHFT O}R {CTRL 9}{LEFT
     ARROW}{CTRL Ø} FOR MENU{2
     CRSR DNs}"           :REM*36
262Ø ML=16:GOSUB14Ø:PRINTSPC(TA
     );:INPUT#1,FI$       :REM*23Ø
263Ø IFFI$="{LEFT ARROW}"THEN74
     Ø                    :REM*25
264Ø IFLEN(FI$)>16THENFI$=LEFT$
     (FI$,16)             :REM*119
265Ø GOSUB19Ø             :REM*184
266Ø ML=29:GOSUB14Ø:PRINTLEFT$(
     CL$,12)SPC(TA)"{SHFT L}OAD
     ING {SHFT G}RAPH "FI$
                          :REM*213
267Ø GOSUB45Ø:OPEN2,8,2,"Ø:"+FI
     $+",S,R":GOSUB46Ø:IFN1>2ØT
     HENCLOSE2:GOTO74Ø     :REM*79
268Ø FORI=ØTO3:INPUT#2,TP:POKE4
     Ø576+I,TP:NEXT       :REM*151
269Ø IFTP>ØTHENK=TP:FORI=1TOK:I
     NPUT#2,TP:POKE4Ø579+I,TP:N
     EXT                  :REM*142
27ØØ INPUT#2,TT$:INPUT#2,LE$:IN
     PUT#2,RN             :REM*247
271Ø IFTT$="."THENTT$=" "
                          :REM*119
272Ø IFLE$="."THENLE$=" "
                          :REM*46
273Ø FORI=1TORN:INPUT#2,RV(I):I
     NPUT#2,RN$(I):IFRN$(I)="."
     THENRN$(I)=" "       :REM*86
274Ø NEXT                 :REM*61
275Ø GOSUB51Ø:CLOSE2:CLOSE15:G=
     1:GOTO74Ø            :REM*64
276Ø REM **** PRINTER SETUP ***
     *                    :REM*118
277Ø ML=1Ø:GOSUB14Ø:PRINT"{SHFT
      CLR}"SPC(TA)"{CTRL 9}{SHF
     T P}{SHFT R}{SHFT I}{SHFT
     N}{SHFT T}{SHFT E}{SHFT R}
      {SHFT S}{SHFT E}{SHFT T}{
     SHFT U}{SHFT P}{2 CRSR DNs
     }"                   :REM*3Ø
278Ø IFMO=128 THEN BANKØ
                          :REM*138
279Ø A$="YES":IFPEEK(4Ø576)<>ØT
     HENA$="NO "          :REM*6Ø
28ØØ PRINT"{SHFT C}{SHFT B}{SHF
     T M} {SHFT D}OT {SHFT M}AT
     RIX {SHFT P}RINTER{2 SPACE
     s}"A$"{5 CRSR LFs}";:INPUT
     A$                   :REM*241
281Ø IFA$="NO"THENPOKE4Ø576,1:G
     OTO283Ø              :REM*2Ø9
282Ø POKE4Ø576,Ø          :REM*96
283Ø S1=PEEK(4Ø577):S2=PEEK(4Ø5
     78):CD=PEEK(4Ø579):REM*152
284Ø PRINT:PRINT"{SHFT T}EXT {S
     HFT S}ECONDARY {SHFT A}DDR
     ESS:{2 SPACEs}"S1"{4 CRSR
     LFs}";:INPUTS1       :REM*32
285Ø PRINT:PRINT"{SHFT G}RAPHIC
      {SHFT S}ECONDARY {SHFT A}
     DDRESS:{2 SPACEs}"S2"{4 CR
     SR LFs}";:INPUTS2 :REM*189
286Ø PRINT:PRINT"{SHFT P}RINTER
      {SHFT C}ONTROL {SHFT C}OD
     ES:{2 SPACEs}"CD"{4 CRSR L
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Continued on p. 90.

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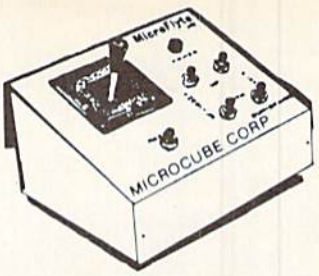

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Circle 73 on Reader Service card.

From p. 87.

```
Fs}";:INPUTCD          :REM*56
287Ø POKE4Ø577,S1:POKE4Ø578,S2:
     POKE4Ø579,CD      :REM*197
288Ø IFCD=ØTHEN293Ø    :REM*139
289Ø FORI=1TOCD:CT=PEEK(4Ø579+I
     )                 :REM*52
29ØØ PRINT"{3 SPACEs}{SHFT C}OD
     E"I": ";LEFT$(STR$(CT)+"{3
      SPACEs}",3)"{4 CRSR LFs}"
     ;                 :REM*5Ø
291Ø INPUTCT:POKE4Ø579+I,CT:NEX
     T                 :REM*92
292Ø IFMO=128 THEN BANK15
                       :REM*154
293Ø GOTO74Ø           :REM*2ØØ
294Ø REM **** CREATE GRAPH DISK
      ****             :REM*215
295Ø GOSUB17Ø:PRINT    :REM*128
296Ø ML=28:GOSUB14Ø:PRINTSPC(TA
     )"1.{2 SPACEs}{SHFT U}SER
     DEFINED RANGES"   :REM*254
297Ø PRINTSPC(TA+4)"{SHFT T}ALL
     Y FIELD ({SHFT A}LPHA/{SHF
     T N}UMERIC)":PRINT :REM*6Ø
298Ø PRINTSPC(TA)"2.{2 SPACEs}{
     SHFT U}SER DEFINED RANGES"
                       :REM*185
299Ø PRINTSPC(TA+4)"{SHFT T}ALL
     Y FIELD ({SHFT N}UMERIC)":
     PRINT             :REM*144
3ØØØ PRINTSPC(TA)"3.{2 SPACEs}{
     SHFT F}ILE DEFINED RANGES"
                       :REM*1ØØ
3Ø1Ø PRINTSPC(TA+4)"{SHFT S}UM
     FIELD":PRINT      :REM*32
3Ø2Ø PRINTSPC(TA)"4.{2 SPACEs}{
     SHFT R}ETURN TO {SHFT M}AI
     N {SHFT M}ENU"    :REM*246
3Ø3Ø ML=21:GOSUB14Ø:PRINTCL$SPC
     (TA)"{SHFT E}NTER SELECTIO
     N (1-4)";         :REM*119
3Ø4Ø GETA$:IFA$=""THEN3Ø4Ø
                       :REM*98
3Ø5Ø D=VAL(A$):ONDGOTO36ØØ,374Ø
     ,395Ø,74Ø:GOTO3Ø4Ø:REM*1Ø5
3Ø6Ø ML=38:GOSUB14Ø:PRINTSPC(TA
     )"{SHFT S}OME{2 SPACEs}DAT
     ABASE/FILE{2 SPACEs}MANAGE
     R{2 SPACEs}PROGRAMS"
                       :REM*134
3Ø7Ø PRINTSPC(TA)"PLACE DATA US
     ED BY THE PROGRAM SUCH AS"
                       :REM*7Ø
3Ø8Ø PRINTSPC(TA)"NUMBER OF{2 S
     PACEs}FIELDS,{2 SPACEs}NAM
     ES{2 SPACEs}OF{2 SPACEs}FI
     ELDS,"            :REM*244
3Ø9Ø PRINTSPC(TA)"NUMBER OF REC
     ORDS, ETC IN FRONT OF THE"
                       :REM*12Ø
31ØØ PRINTSPC(TA)"ACTUAL DATA.
     {SHFT Y}OU CAN USUALLY DET
     ERMINE"           :REM*187
311Ø PRINTSPC(TA)"HOW MANY OF T
     HESE "CHR$(34)"CONTROL"CHR
     $(34)" FIELDS YOU" :REM*69
312Ø PRINTSPC(TA)"WILL NEED{2 S
     PACEs}TO{2 SPACEs}SKIP{2 S
     PACEs}BY{2 SPACEs}LOADING{
     2 SPACEs}YOUR"    :REM*138
313Ø PRINTSPC(TA)"FILE INTO A W
     ORD PROCESSOR.{2 SPACEs}{S
     HFT E}NTER THE"   :REM*14
314Ø PRINTSPC(TA)"NUMBER OF FIE
     LDS TO SKIP,{2 SPACEs}OR{2
      SPACEs}"CHR$(34)"{LEFT AR
     ROW}"CHR$(34)"{2 SPACEs}TO
     "                 :REM*1ØØ
315Ø PRINTSPC(TA)"RETURN TO THE
      {SHFT M}{SHFT A}{SHFT I}{
     SHFT N} {SHFT M}{SHFT E}{S
     HFT N}{SHFT U}.{2 CRSR DNs
     }"                :REM*45
316Ø PRINT"{SHFT E}NTER NUMBER
     FIELDS TO SKIP";:INPUT"{3
     SPACEs}{3 CRSR LFs}";A$
                       :REM*2
317Ø IFA$="{LEFT ARROW}"THEN74Ø
                       :REM*171
318Ø SK=VAL(A$):RETURN :REM*185
319Ø ML=38:GOSUB14Ø:PRINTSPC(TA
     )"{SHFT T}HE {SHFT R}ANGES
      SPECIFIED BELOW MUST BE T
     HE"               :REM*242
32ØØ PRINTSPC(TA)"INFORMATION Y
     OU WISH TO{2 SPACEs}TALLY{
     2 SPACEs}WITHIN"  :REM*51
321Ø PRINTSPC(TA)"A PARTICULAR
     FIELD.{2 SPACEs}{SHFT F}IR
     ST{2 SPACEs}ENTER{2 SPACEs
     }THE"             :REM*1Ø8
322Ø PRINTSPC(TA)"DISPLACEMENT
     OR FIELD{2 SPACEs}NUMBER{2
      SPACEs}OF{2 SPACEs}THE"
                       :REM*211
323Ø PRINTSPC(TA)"DATA YOU WISH
      TO TALLY. {SHFT T}HEN ENT
     ER THE"           :REM*143
324Ø PRINTSPC(TA)"{SHFT R}ANGES
      AS REQUESTED.{2 CRSR DNs}
     "                 :REM*159
325Ø PRINTSPC(TA)"{SHFT F}IELD
     NUMBER OF DATA";:INPUT"{3
     SPACEs}{3 CRSR LFs}";A$:DD
     =VAL(A$):PRINT    :REM*52
326Ø IFA$="{LEFT ARROW}"THEN74Ø
                       :REM*46
327Ø IFDD=ØTHEN325Ø    :REM*229
328Ø PRINTSPC(TA)"{SHFT N}UMBER
      OF FIELDS PER RECORD";
                       :REM*85
3285 INPUT"{3 SPACEs}{3 CRSR LF
     s}";A$:NF=VAL(A$):PRINT
                       :REM*98
329Ø IFA$="{LEFT ARROW}"THEN74Ø
                       :REM*12
33ØØ IFNF=ØTHEN328Ø    :REM*81
331Ø RETURN            :REM*113
332Ø ML=38:GOSUB14Ø:PRINTSPC(TA
     )"{SHFT T}HE {SHFT R}ANGES
      SPECIFIED BELOW MUST DEFI
     NE"               :REM*3Ø
333Ø PRINTSPC(TA)"THE RECORDS I
     N WHICH YOU{2 SPACEs}WILL{
     2 SPACEs}SUM{2 SPACEs}A"
                       :REM*31
334Ø PRINTSPC(TA)"PARTICULAR{2
     SPACEs}FIELD.{3 SPACEs}{SH
     FT F}IRST{2 SPACEs}ENTER{2
      SPACEs}THE"      :REM*196
335Ø PRINTSPC(TA)"DISPLACEMENT
     OR FIELD{2 SPACEs}NUMBER{2
      SPACEs}OF{2 SPACEs}THE"
                       :REM*84
336Ø PRINTSPC(TA)"DATA YOU WISH
      TO SUM.{2 SPACEs}{SHFT T}
     HEN{2 SPACEs}ENTER THE"
                       :REM*234
337Ø PRINTSPC(TA)"FIELD NUMBER
     OF THE FIELD{2 SPACEs}OF{2
      SPACEs}RANGES."   :REM*8
338Ø PRINTSPC(TA)"{SHFT F}INALL
     Y ENTER THE {SHFT R}ANGES
     AS REQUESTED.{2 CRSR DNs}"
                       :REM*157
339Ø PRINTSPC(TA)"{SHFT F}IELD
     NUMBER OF DATA";:INPUT"{3
     SPACEs}{3 CRSR LFs}";A$:DR
     =VAL(A$):PRINT    :REM*35
34ØØ IFA$="{LEFT ARROW}"THEN74Ø
                       :REM*186
341Ø IFDR=ØTHEN339Ø    :REM*198
342Ø PRINTSPC(TA)"{SHFT F}IELD
     NUMBER FOR {SHFT R}ANGES";
     :INPUT"{3 SPACEs}{3 CRSR L
     Fs}";A$:DD=VAL(A$):PRINT
                       :REM*46
343Ø IFA$="{LEFT ARROW}"THEN74Ø
                       :REM*152
344Ø IFDD=ØTHEN342Ø    :REM*133
345Ø PRINTSPC(TA)"{SHFT I}S {SH
     FT R}ANGE {SHFT A}LPHA OR
     {SHFT N}UMERIC (A/N)";:INP
     UT"{3 SPACEs}{3 CRSR LFs}"
     ;A$               :REM*86
346Ø IF A$<>"A"ANDA$<>"N"THEN34
     5Ø                :REM*253
347Ø NA$=A$            :REM*188
348Ø PRINTSPC(TA)"{SHFT N}UMBER
      OF FIELDS PER RECORD";
                       :REM*28
3485 INPUT"{3 SPACEs}{3 CRSR LF
     s}";A$:NF=VAL(A$):PRINT
                       :REM*186
349Ø IFA$="{LEFT ARROW}"THEN74Ø
                       :REM*212
35ØØ IFNF=ØTHEN348Ø    :REM*58
351Ø RETURN            :REM*74
352Ø GOSUB17Ø          :REM*4
3525 PRINT"{SHFT E}NTER FILENAM
     E OR":PRINT"{2 SPACEs}{CTR
     L 9}{LEFT ARROW}{CTRL Ø} F
     OR {SHFT M}{SHFT A}{SHFT I
     }{SHFT N}{SHFT SPACE}{SHFT
      M}{SHFT E}{SHFT N}{SHFT U
     }:{2 SPACEs}";:INPUT#1,FI$
                       :REM*82
353Ø IFFI$="{LEFT ARROW}"THEN74
     Ø                 :REM*152
354Ø IFLEN(FI$)>16THENFI$=LEFT$
     (FI$)             :REM*42
355Ø PRINT"{CRSR DN}":PRINT"{SH
     FT O}PENING FILE:{2 SPACEs
     }"FI$             :REM*24Ø
356Ø GOSUB45Ø:OPEN2,8,2,"Ø:"+FI
     $+",S,R":GOSUB46Ø:IFN1>2ØT
     HENCLOSE2:GOTO352Ø:REM*237 ►
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```
357Ø PRINT:PRINT"{SHFT S}KIPPIN
     G INFO DATA{CRSR DN}":FORI
     =1TOSK:INPUT#2,A$ :REM*184
358Ø IFST AND 64 THENPRINT"{SHF
     T S}KIP FIELDS NOT SPECIFI
     ED CORRECTLY":N1=22:RETURN
                          :REM*155
359Ø NEXT:PRINT"{2 CRSR DNs}":R
     ETURN                :REM*223
36ØØ GOSUB17Ø:GOSUB3Ø6Ø:GOSUB17
     Ø:GOSUB319Ø          :REM*2Ø3
361Ø FORI=1TORN:PRINT"{SHFT L}A
     BEL FOR {SHFT R}ANGE"I"{CR
     SR LF}:{2 SPACEs}{CTRL 9}"
     ;:INPUT#1,RN$(I):PRINT:NEX
     T                    :REM*252
362Ø GOSUB352Ø:IFN1=22THENFORI=
     1TO15ØØ:NEXT:GOTO36ØØ
                          :REM*138
363Ø PRINT"{SHFT R}EADING DATA:
     "                    :REM*192
364Ø R=1                  :REM*145
365Ø FORF=1TONF           :REM*2
366Ø PRINT"{SHFT R}ECORD"R"{SHF
     T F}IELD"F"... ";    :REM*6Ø
367Ø INPUT#2,A$:RS=ST     :REM*236
368Ø PRINTA$:IFF<>DDTHEN371Ø
                          :REM*75
369Ø FORI=1TORN:IFA$=RN$(I)THEN
     RV(I)=RV(I)+1        :REM*154
37ØØ NEXT                 :REM*248
371Ø IFRS AND 64 THENPRINT"{CRS
     R DN}{SHFT F}INISHED READI
     NG DATA":GOTO373Ø    :REM*154
372Ø NEXT:R=R+1:GOTO365Ø:REM*44
373Ø CLOSE2:GOSUB51Ø:G=1:FORI=1
     TO1ØØØ:NEXT:GOTO74Ø
                          :REM*242
374Ø GOSUB17Ø:GOSUB3Ø6Ø:GOSUB17
     Ø:GOSUB319Ø          :REM*68
375Ø ML=37:GOSUB14Ø:PRINTSPC(TA
     )"{CTRL 9}{SHFT T}HE FOLLO
     WING ENTRIES MUST BE {SHFT
      N}{SHFT U}{SHFT M}{SHFT E
     }{SHFT R}{SHFT I}{SHFT C}{
     CTRL Ø}{CRSR DN}"    :REM*54
376Ø FORI=1TORN           :REM*198
377Ø PRINT"{SHFT L}OW VALUE FOR
      {SHFT R}ANGE"I"{CRSR LF}:
     {2 SPACEs}{CTRL 9}";:INPUT
     #1,A$:RA(I,1)=VAL(A$):PRIN
     T                    :REM*183
378Ø PRINT"{SHFT H}IGH VALUE FO
     R {SHFT R}ANGE"I"{CRSR LF}
     : {CTRL 9}";:INPUT#1,A$:RA
     (I,2)=VAL(A$):PRINT
                          :REM*2Ø4
379Ø PRINT:IFRA(I,1)<=RA(I,2)TH
     EN381Ø               :REM*163
38ØØ ML=3Ø:GOSUB14Ø:PRINTSPC(TA
     )"{CTRL 9}{SHFT E}{2 SHFT
     Rs}{SHFT O}{SHFT R}{CTRL Ø
     }:{2 SPACEs}{SHFT H}IGH {S
     HFT V}ALUE < {SHFT L}OW {S
     HFT V}ALUE{CRSR DN}":GOTO3
     77Ø                  :REM*247
381Ø R1$=RIGHT$(STR$(RA(I,1)),L
     EN(STR$(RA(I,1)))-1)
                          :REM*242
382Ø R2$=RIGHT$(STR$(RA(I,2)),L
     EN(STR$(RA(I,2)))-1):RN$(I
     )=R1$+"-"+R2$:NEXT:REM*215
383Ø GOSUB352Ø:IFN1=22THENFORI=
     1TO15ØØ:NEXT:GOTO374Ø
                          :REM*215
384Ø PRINT"{SHFT R}EADING DATA:
     "                    :REM*243
385Ø R=1                  :REM*66
386Ø FORF=1TONF           :REM*244
387Ø PRINT"{SHFT R}ECORD"R"{SHF
     T F}IELD"F"... ";    :REM*99
388Ø INPUT#2,A$:RS=ST     :REM*191
389Ø PRINTA$:IFF<>DDTHEN392Ø
                          :REM*64
39ØØ FORI=1TORN:IFVAL(A$)>=RA(I
     ,1)ANDVAL(A$)<=RA(I,2)THEN
     RV(I)=RV(I)+1        :REM*163
391Ø NEXT                 :REM*199
392Ø IFRS AND 64 THENPRINT:PRIN
     T"{CRSR DN}{SHFT F}INISHED
      READING DATA":GOTO394Ø
                          :REM*116
393Ø NEXT:R=R+1:GOTO386Ø
                          :REM*2Ø8
394Ø CLOSE2:GOSUB51Ø:G=1:FORI=1
     TO1ØØØ:NEXT:GOTO74Ø
                          :REM*199
395Ø GOSUB17Ø:GOSUB3Ø6Ø:GOSUB17
     Ø:GOSUB332Ø          :REM*48
396Ø FORI=1TORN:PRINT"{SHFT L}A
     BEL FOR {SHFT R}ANGE"I"{CR
     SR LF}:{2 SPACEs}{CTRL 9}"
     ;:INPUT#1,RN$(I):PRINT:NEX
     T                    :REM*147
397Ø GOSUB352Ø:IFN1=22THENFORI=
     1TO15ØØ:NEXT:GOTO395Ø
                          :REM*249
398Ø PRINT"{SHFT R}EADING DATA:
     "                    :REM*124
399Ø R=1                  :REM*2Ø6
4ØØØ FORF=1TONF           :REM*99
4Ø1Ø PRINT"{SHFT R}ECORD"R"{SHF
     T F}IELD"F"... ";    :REM*159
4Ø2Ø INPUT#2,A$:RS=ST:    :REM*246
4Ø3Ø PRINTA$:IFF=DDTHENTD$=A$
                          :REM*229
4Ø4Ø IFF=DRTHENTD=VAL(A$)
                          :REM*139
4Ø5Ø IFRS AND 64 THENPRINT:PRIN
     T"{CRSR DN}{SHFT F}INISHED
      READING DATA":GOTO4Ø7Ø
                          :REM*142
4Ø6Ø NEXT                 :REM*78
4Ø7Ø FORI=1TORN           :REM*14
4Ø8Ø IFNA$="A"THENIFTD$=RN$(I)T
     HENRV(I)=RV(I)+TD    :REM*1Ø6
4Ø9Ø IFNA$="N"THENIFVAL(TD$)=VA
     L(RN$(I))THENRV(I)=RV(I)+T
     D                    :REM*52
41ØØ NEXT                 :REM*15Ø
411Ø IFRS AND 64 THENPRINT:PRIN
     T"{CRSR DN}{SHFT F}INISHED
      READING DATA":GOTO413Ø
                          :REM*2ØØ
412Ø R=R+1:GOTO4ØØØ       :REM*158
413Ø CLOSE2:GOSUB51Ø:G=1:FORI=1
     TO1ØØØ:NEXT:GOTO74Ø
                          :REM*132 ■
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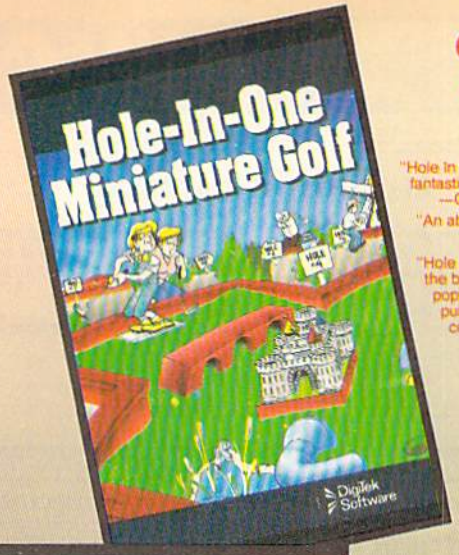

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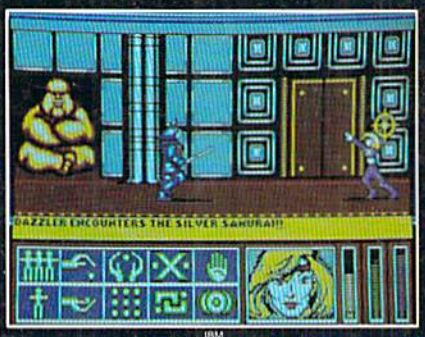

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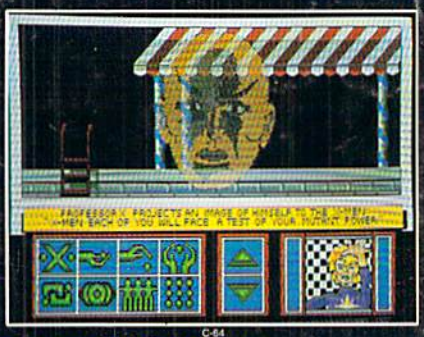
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